# 中国纤维流行趋势报告

CHINA FIBERS FASHION TRENDS REPORT

## 2016 / 2017

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国家工业和信息化部消费品工业司
中国化学纤维工业协会
东华大学
国家纺织化纤产品开发中心
中国纺织工程学会

盛虹股份
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创新De纤维技术

# 中国纤维

流 行 趋 势 报 告

# CHINA FIBERS
## FASHION TRENDS REPORT

# 2016 / 2017

从流行趋势发布看，内容越来越丰富，社会及行业关注度不断提升，作用意义更加明显，成为行业质量品牌建设的重要方面。同意继续开展此项工作，并希望发挥更大作用，成为政府部门引导行业发展，提供服务的有效途径和方式。

原工业和信息化部总工程师 —— 王黎明



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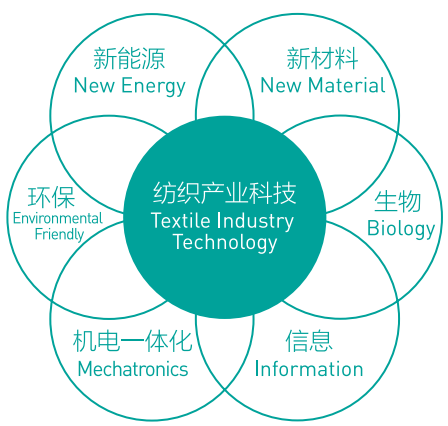
# 化纤工业先进制造科技发展趋势与战略

## 前言

“十二五”期间，中国化纤工业持续推进结构调整和产业升级，行业整体保持平稳、可持续的发展态势，较好完成了“十二五”发展规划的主要目标和任务，为实现化纤强国的目标奠定了坚实的基础。高性能纤维方面，我国在碳纤维、芳纶和超高分子量聚乙烯三大品种形成了我国特色的产业，产量占全球的三分之一；新型功能纤维方面，细旦、超细旦、异型、阳离子可染、原液着色等差别化纤维品种相继实现产业化，与国际先进水平相当，尤其是在工程与应用方面形成了核心体系；生物基化学纤维方面，实现了纤维素纤维原料的多样化，在生物法多元醇、戊二胺、新溶剂法纤维素纤维、聚乳酸纤维等的工程化和产业化方面取得了很大进展；循环再生纤维领域，我国在废旧瓶片回收体系基础上，初步建立了废旧纺织纤维回收利用体系。当今世界正处于互联网、新能源、新材料、生物技术，以及绿色、智能、普惠和可持续为特征的新科技革命和第三次工业革命重合期，全球化、数字化、智能化、绿色化、精细化、定制化等使得科技创新与企业经济发展的关系比以往任何时候都更加直接和密切。纵观先进制造技术的演进趋势，“绿色”和“智能”将成为主要的发展潮流。这给化纤工业的产业形态、生产方式、商业模式等带来深刻的影响。新的国际竞争环境，对我国化纤工业的国际定位和转型提出了迫切要求。

**新兴科技交叉与融合形成多维发展空间**
Advanced Technology Makes Multidimentional Development Space




**纺织产业科技发展主题**
Development Theme of Textile Technology

- 极限 Limit
- 多元 Multielement
- 智能 Intelligence
- 绿色 Green
- 融合 Fusion
- 服务 Service



# INNOVATION TREND OF ADVANCED MANUFACTURING TECHNOLOGY AND STRATEGY OF CHEMICAL FIBER INDUSTRY

## PREFACE

The period of the "12th Five-Year Plan", the China chemical fiber industry continues to promote the structural adjustment and industrial upgrading, maintains the whole industry in a stable and sustainable development trend, and has better completed the main objectives and tasks of the development planning for the "12th Five-Year Plan" that has laid a solid foundation to accelerate the realization of the goal of a chemical fiber power. In terms of high-performance chemical fibers, 3 varieties of carbon fibers, aramid fibers and high-strength high-modulus polyethylene fibers in China have formed the characteristic industry of China with a yield accounting for 1/3 of the global output; in terms of new functional fibers, the fine and superfine, heterotypic, cationic dyeable, dope-dyed and other differentiated fiber varieties have achieved industrialization successively, equivalent to the international advanced level, especially in the engineering and application they have formed the core system; in terms of biological fiber, it has realized the diversification of cellulose raw materials, and the engineering and industrialization of the biological method polyol with pentamethylene diamine, new solvent method cellulose fiber, polylactic acid fiber and other substances has made great progress; in the generated fiber field, China has established preliminarily the waste textile fiber recycling system in the field of fiber based on the waste bottle flaks recycling system.

The world today is in a period of new scientific and technologic revolution coinciding with the third industrial revolution with the Internet, new energy, new materials and bio-technology, as well as green, intelligent, inclusive and sustainable features, the globalization, digitization, intelligence, greening, refinement, customization and others make the relation between the scientific and technologic innovation and the enterprise and economic development more direct and closer than any previous time. Comprehensively survey the evolution trend of the advanced manufacturing technology that the 'greening' and 'intelligence' will become the main development trend. This brings a profound influence to the industry form, production mode, commercial model and other aspects of the chemical fiber industry. The new international competitive situation proposes urgent requirement to the international orientation and transformation of China's chemical fiber industry.

# 一．化纤工业先进制造科技发展现状及创新趋势

**1. 国际化纤工业先进制造技术发展趋势**

随着生物、纳米、信息、互联网等高新技术与纤维科学与工程的融合发展，建筑、能源、交通、资源、环保等新兴领域对于纤维性能功能需求的不断提高，纤维材料科学与技术以材料设计、成型与应用机理等为基础，更加关注资源环境生态低碳等社会责任，全面突破原有的纺织原料框架，赋予全新的视角与内涵，挑战纤维性能、功能极限。涌现了一大批利用现代生物、信息、纳米等技术研究开发的具有特殊的力学、耐热、抗老化等性能和发光荧光、光能吸收储存与转换、导电抗静电、阻燃、抗菌、抗紫外、耐污易清洗等功能的纤维新品种。目前，纤维新材料主要包括高性能纤维、新型功能与智能纤维、生物基化学纤维、纳米纤维和循环再生纤维等领域。化纤工业先进制造科技创新趋势主要有：

**(1)纤维的性能向高性能、高功能及结构功能一体化方向发展。**

即把纤维材料作为重要的工程材料和功能材料，加工技术与产品体系在通用纤维体系上有重大提升，甚至从材料设计角度重新构筑新产品；高浓度高效凝胶纺丝、熔喷湿纺、液晶纺丝等关键技术发展进入突破性阶段。

**(2)纤维的成分由简单混合向多元精细构筑方向发展。**

重点发展多重复合和有机——无机杂化纤维等技术，将纳米、生物材料科技与纤维加工高度融合，尤其是在有机新原料合成与聚合、碳纳米管、石墨烯复合纤维等领域发展迅速。

**(3)纤维的尺寸向低维化方向发展。**

加工技术向静电纺丝、相分离法纺丝及生物合成技术拓展，产品应用向功能服装、环境保护、纳米器件等新兴领域发展，重点开展纳米纤维规模化制备与高技术应用研究。

# 1. DEVELOPMENT STATUS AND INNOVATION TREND OF ADVANCED MANUFACTURING TECHNOLOGY OF CHEMICAL FIBER INDUSTRY

**1. Development Trend of Advanced Manufacturing Technology of International Chemical Fiber Industry**

In pass with the integration and development of biology, nano, information and other high technologies with fiber science and engineering, the functional demands of construction, energy, transportation, resources, environmental protection and other emerging areas for fiber property continuously increase, the science and technology of fiber materials based on the design, formation and application mechanism of materials, pays more attention to the ecology, environment, resources, low carbon and other social responsibilities, comprehensive breaks through the original framework of the textile raw materials, and gives a fully new perspective and connotation with the challenge to the functional limit of the fiber property. A large number of new fiber varieties with special mechanics, heat resistance, anti-aging and other properties, and having photoluminescence, lighting energy absorption, storage and conversion, conductive and antistatic, flame retardant, antibacterial, UV-resistant, soiling resistant and easy-to-clean, and other functions researched and developed by using the modern biology, information, nano and other technologies, are emerged. At present, the new fiber materials include mainly the high performance fiber, new functional and intelligent fiber, bio-based chemical fiber, nano fiber and regenerated fiber and other fields. The innovation trend of advanced manufacturing technology of the chemical fiber industry mainly includes:

(1) The properties of fibers develop towards the direction of high performance, high function and the integration of structure and function.

Namely the fiber materials are used as important engineering materials and functional materials, the processing technology and product system has been greatly improved in the universal fiber system, even has created new products from the perspective of material design; the development of high-concentration and high-efficiency gel spinning, melt jet- wet spinning, liquid-crystal spinning and other key technologies has entered a breakthrough stage.

(2) The Fiber components develop from simple mixing towards the multiple fine creation direction.

The focus is on the development of multiple composite and organic-inorganic hybrid and other fibers by high integration of material technology with fiber processing, especially in the new organic material synthesis and polymer and carbon nanotubes, graphene composite fiber and other fields, it has got a rapid growth.

(3) The fiber size develops towards the low dimensional direction.

The processing technology expands to the electrostatic spinning, phase-separation

**(4)功能与产业用纤维由被动向主动方向发展。**

从单一功能向多功能组合方向发展，尤其是材料设计与加工技术相互交融。重点开展面向新型领域需求的智能纤维、新型高技术纤维的研究，如智能纤维等。

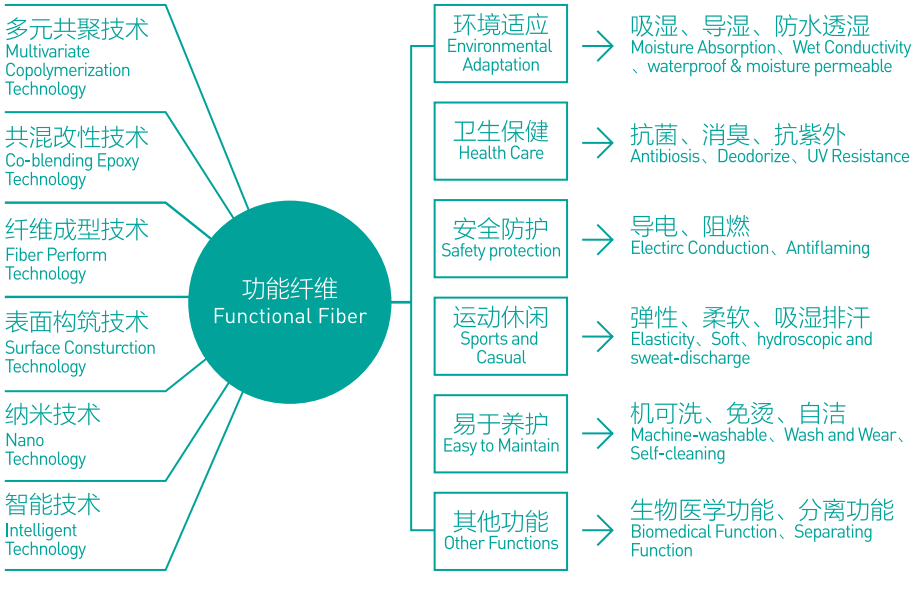
**(5)成纤聚合物的合成和纤维成形技术向生物化方向发展。**

既是资源战略发展需要，更是人体亲和与环境友好发展趋势。重点开展生物法合成单体、聚合物以及仿生纺丝等研究。

与此同时，国际化纤产业格局深入调整，国际和区域贸易规则及环境不断变化，欧、美、日等发达国家逐渐退出常规化纤生产，纷纷实施“再工业化”战略，转向符合国家战略需求、利润更高、受资源或环境约束小的新型高性能、差别化功能性、生物基、循环再生、纳米纤维的研发和生产，进行大范围的行业重组，更加关注与下游终端需求的合作，凭借科技、品牌和供应链整合等优势，在高技术和高附加值产品领域显现出强劲的竞争势头。印度和以东南亚国家为主的发展中国家凭借低成本和国际贸易优惠以及强劲的经济增长速度和庞大的消费群基础，不断提升中低端领域制造能力，加快承接纺织化纤工业的国际梯度转移。

先进纤维制造向全球化、信息化、智能化、绿色化、精细化并与多学科融合的发展方向。纤维的性能向高性能化、品种向功能化、纤维原料和纤维制备向生态化方向发展。运用纳米、差异、复合、超细、共聚和接枝等技术，在设计与提升化纤的性能和功能同时，联合服装、家纺和产业用纺织品等领域专业化开发，建立纤维管理、产品开发、应用推广与营销等职能系统，引领行业发展与消费需求；面向应用的高性能纤维及其材料技术集成系统研发成为发达国家化纤发展的重要领域，碳纤维、芳纶、超高分子量聚乙烯纤维、纳米纤维等技术与应用体系加速发展。

产品设计、制造、使用、回收再利用——资源的高效清洁利用和环境影响的最小化成为发展方向。为应对大量消耗不可再生的化石资源，适应绿色环保和可持续发展趋势，结合人体亲和、舒适健康等需求，融合差别化、功能化柔性制备技术，由上而下、与由下而上结合，建立开发与推广应用及品牌体系，研究开发同质异构的新型功能化生物基化学纤维，以及资源的回收和循环利用纤维的专业化开发成为国家战略。






method spinning and biosynthesis technologies, while the product application develops to the functional clothing, environment, nano devices and other emerging areas, the focus is on the research on the large scale preparation and high-tech application of nano fibers.

**(4) The functional and industrial fibers develop from passive to active direction.**

They develops from a single function to multifunctional combination direction, especially in the mutual interaction of material design with processing technology. The focus is on the research on the new area demand-oriented intelligent fibers and new high tech fibers, such as the intelligent fibers.

**(5) The finished fiber polymer synthesizing and fiber forming technology develops towards the biological direction.**

It is the need for strategic development of resources, and is moreover the trend of the affinity to human and environmentally friendly development. The focus is on the research on the biological synthesis of monomer, polymer and biomimetic spinning.

At the same time, the pattern of international chemical fiber industry is in deep adjustment, the international and regional trade rules and environment changes continuously, and the Europe, America, Japan and other developed countries are gradually withdrawing from the conventional chemical fiber production and implement the "Re-industrialization" strategy to increase the efforts in the research and development of high-tech fibers and highly-functional fibers, conduct a wide range of industrial restructuring, and pay more attention to the cooperation required with the downstream ends, demonstrating a strong momentum of competition in the fields of high technologies and high added-value products relying on the integration of technology, brand and supply chain, and other advantages. The developing countries such as India and the Southeast Asian countries constantly improve their manufacturing capacity in medium-/low-end areas and speed up the undertaking of international gradient transfer of textile and chemical fiber industries relaying on the low cost and international trade concessions as well as the strong economic growth and huge consumption basis.

The developed countries constantly adjust their industrial structure to gradually reduce or withdraw from the production of conventional chemical fiber products, and turn to the R&D and production of new high-performance, differentiated functional, bio-based, generating and nano fibers meeting the national strategic needs, higher profits, less constraints of resources and environment with new characteristics presented technologically.

The advanced fiber manufacturing develops towards the direction of globalization, informatization, intelligence, greening, refining and multi-disciplinary integration. The fiber property develops towards the high performance, the varieties towards the functionalization, and the fiber raw materials and fiber preparation towards the ecology direction. Use the nano, differentiation, composite, superfine, copolymerization, grafting and other technologies to establish the fiber management, product development, application and promotion, marketing and other functional systems, design and improve the fiber performances and functions while uniting the clothing and apparel, household and industrial textile and other fields to conduct professional development to lead the industrial development and consumer demands; the research and development of integration system of the application-oriented high performance fiber and its material technologies, has become an important area of the chemical fiber development in the developed countries, and the development of carbon fiber, aramid fiber,

## 2. 我国化纤工业先进制造科技现状及发展趋势

通过十多年的快速发展和建设，我国化纤行业的技术进步非常明显，纤维产品质量和差异化程度明显提高，纤维技术向高速、高效、短流程、全自动、规模化、清洁化、低成本方向发展，纤维加工向全流程数字化方向发展行业发展呈现出多元化、功能化、绿色化和高性能化等特点。主要体现在以下几个方面。

（1）高性能纤维领域注重开展纤维生产制备过程中多尺度结构形成机制、演变规律及其调控方法的系统研究、高性能纤维成纤聚合物连续稳定制备的关键技术和设备、液晶纺丝的关键技术和设备、冻胶纺丝关键技术和设备、高黏度纺丝流体脱泡关键技术和设备等的研发，以及低成本碳纤维制备技术等的研发。

（2）新型功能纤维领域注重聚酯纤维的高仿真技术、聚酰胺纤维高质量切片原料技术及其配套技术等的研发，推动纤维和纺织品一条龙的应用开发，拓展下游应用领域，寻找新的增长点，引领市场。聚酯纤维的发展以聚合与成形原理、多重结构改性为基础，开发聚酯超大容量聚合、多重在线添加、仿真模型过程化、节能与智能物流等高效与柔性化工程关键技术为一体的全流程数字化控制系统，实现大容量聚酯差别化与高品质结合，促进信息技术与化纤工业融合。

（3）新型生物基化学纤维领域注重生物基化学纤维及生化原料的发展，充分利用农产品、农作物废弃物和竹麻、速生林等资源，实现可再生、可降解、可循环，以及对环境友好的生物基化学纤维及综合开发利用的产业化。以 Lyocell 工艺法、离子液体法、碱 / 尿素法等开展新溶剂清洁化生产工艺生产纤维素纤维。在现有聚乳酸、多元醇聚酯等非石油基纤维材料制备技术的基础上，研发能够大规模取代传统聚酯的生物基合成纤维新品种等。

（4）循环再生纤维领域注重结合现实回收过程的实际问题对回收路线进行优化，实现系列关键技术的突破，研发出领先国际的废旧聚酯回收再生生产线，注重扩宽再生制品的应用领域，形成良性的产业格局。



ultra-high molecular weight polyethylene fiber, polyimide fiber, nano fiber and other technologies and application systems are accelerated.

The product design, manufacture, use, recycling and reuse – is the development direction of efficient and clean utilization of resources and minimization of environmental influence. Establish the R&D, promotion and application and brand systems to research and develop the isomeric new functional bio-based chemical fibers and make the professional development of resource recovery and recycling fibers become the national strategy in response to the massive consumption of nonrenewable oil resources in order to adapt to the trend of green and environmentally-friendly and sustainable development, combined with the human affinity, comfort and health, and other demands to integrate the differentiated and functional flexible preparation technologies and combine the "from top to bottom" with the "from bottom to top".

## 2. Status and Development Trend of Advanced Manufacturing Technologies of China Chemical Fiber Industry

Over 10 years of rapid development and construction, the China's chemical fiber industry has made a very obviously technological progress and the fiber product quality and differentiation degree have significantly improved; the fiber technology develops towards the high speed, high efficiency, short flow process, full automation, large scale, cleanliness and low cost direction, and the fiber processing develops towards the direction of digitalization in whole process with the development of industry presenting a diversification, functionalization, greening and high performance and other characteristics. They are mainly reflected in the following aspects.

(1) The attention in the field of high performance fibers is paid to the systematic research on the formation mechanism, evolution rules and adjusting methods of the multi-scale structures in the fiber production and preparation process, the research and development of the key technology and equipment for continuous and stable preparation of finished fiber polymer of high performance fibers, the key technology and equipment of liquid crystal spinning, the technology and equipment of frozen gel spinning, and the technology and equipment for fluid defoaming of high-viscosity spinning, as well as research and development of the technology for preparation of low cost carbon fibers.

(2) The attention in the new functional fiber field is paid to the research and development of high simulation technology of polyester fiber, raw material technology for high quality slices of polyamide fibers and their supporting technologies to promote the application and development of integrated fibers and textiles, expand the downstream application areas and find out a new growth point to lead the market. The development of polyester fibers uses the polymerizing and forming principle and multiple structure modification as the basis, develops the digital control system in whole process of integrated polyester super-high capacity polymerization, multiple online addition, simulated model process and energy saving with intelligent logistics and other high-efficiency and flexible engineering key technologies to achieve the combination of the large-capacity polyester differentiation and high quality and promote the integration of information technology with chemical fiber industry.

(3) The attention in the new bio-based chemical fiber field is paid to the development of bio-based chemical fiber and bio-chemical raw materials to make full use of agricultural product wastes, crop wastes and bamboo, hemp, fast-growing forest and other resources and achieve the renewable, biodegradable, recyclable and environmentally-friendly bio-based chemical fibers and the industrialization of comprehensive utilization. The Lyocell process, ionic liquid method and alkali/urea method are used to produce cellulose fibers by implementing the new solvent clean production process. On the basis of existing technologies for preparation of polylactic acid, polyester polyols and other non-oil-based fiber materials, research and develop the bio-based synthetic fibers and other new varieties that can displace the traditional polyester in large scale.

(4) The attention in the regenerated and recycled fiber field is paid to the optimization of recovery path combined with the actual problems in the realistic recovery process to achieve a breakthrough in the key technology series, research and develop the internationally leading waste polyester recycling and regenerating production lines emphasizing the expansion of the areas for application of regenerated products to form a good industrial pattern.

# 二 . 我国经济社会发展对化纤工业先进制造科技创新的需求

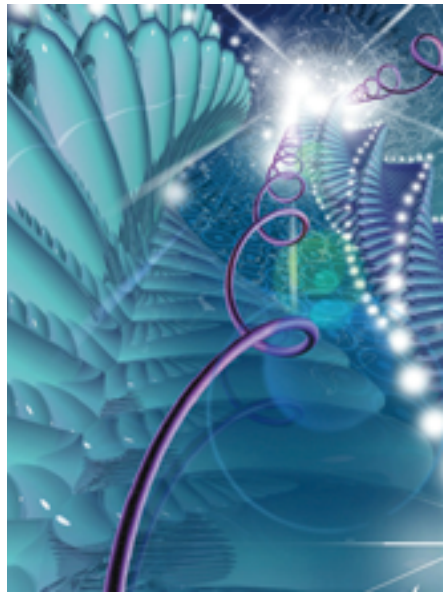
中国化纤工业是最具有国际竞争比较优势的产业，是纺织工业整体竞争力提升的重要支柱产业，是国民经济发展和国家安全不可或缺的重要基石。支撑着现代服装、家纺、安全防护、土工建筑、交通运输、航空航天、生物医学等领域发展，在国民经济中占有举足轻重的地位。

中国化纤工业“十三五”重要任务之一就是要大力实施创新驱动战略，加快结构调整，由“中国制造”向“中国智造”的转型升级，关键是化纤工业先进制造技术的运用创新和发展其将对我国能源资源环境、生态和国民经济相关领域的发展和科技进步产生重要影响，对国民经济的产业结构调整和升级，对国家的经济和国防安全以及我国人们生活质量的改善都具有重要的战略意义。

纤维新材料的应用为信息、生物医用、新材料等高新技术提供关键性新材料，对我国整体技术水平的提高和整体实力的增强有着不可替代的作用。实现我国纤维材料产业向纤维新材料的转型升级，将对我国能源、资源、环境、生态和国民经济相关领域的发展和科技进步产生重要影响，对国民经济的产业结构调整和升级，对国家的经济和国防安全以及我国人们生活质量的改善都具有重要的战略意义。

## 1. 高性能纤维

碳纤维：开发聚合、纺丝、氧化碳化及分析表征的新方法或新途径、新体系，开展高性能化、低成本化、高稳定化的基

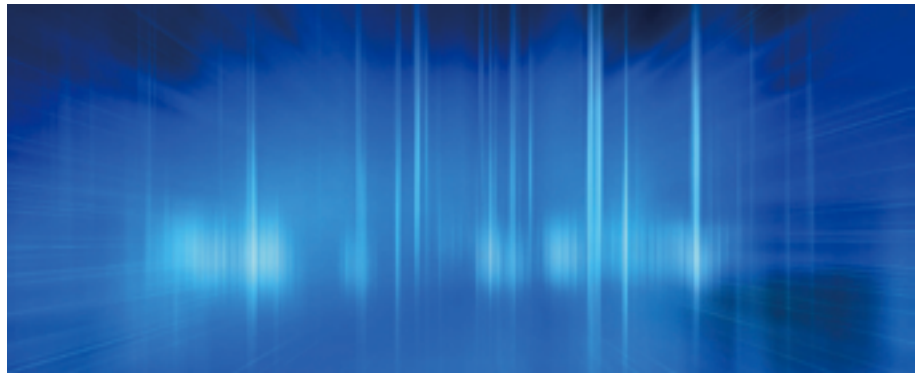


# 2. NEW DEMANDS OF CHINA'S ECONOMIC AND SOCIAL DEVELOPMENT FOR TECHNOLOGICAL INNOVATION OF ADVANCED MANUFACTURING OF CHEMICAL FIBER INDUSTRY

The application of new fiber materials provides new critical materials for information, biomedical, new materials and other new and high technologies, and has an irreplaceable role in the improvement of overall technological level and the enhancement of overall strength of China. The achievement of transformation and upgrading of the fiber material industry in China to the new fiber materials, will produce an important influence on the development and technological progress of China's energy, resources, environment, ecology and related fields of national economy and will have an important strategic significance to the adjustment and upgrading of industrial structure of national economy, to the economy and national security of China, and to the improvement of the quality of our people's life.

## 1. High-Performance Fiber

Carbon Fiber: Develop new method or new path, new system for polymerization, spinning, oxidation carbonization and analytic characterization, carry out research on basics and



础和应用基础研究，针对碳纤维制备过程中的质量稳定、性能提高、连续生产等关键技术问题，开发适用于不同领域需求的碳纤维生产线。实现粘胶基碳纤维生产连续稳定运转，性能提高，成本降低，为国防战略武器提供支撑；实现高强高模 PAN（Polyacrylonitrile 聚丙烯腈）基碳纤维实现规模化稳定生产，满足国防领域及其他民用领域需求；沥青基碳纤维产业化生产，满足国防领域需求。

有机高性能纤维：深入研究有机高性能纤维成型与控制机制，结合应用领域对产品性能的具体需求，从原料、结构设计以及制备工艺等多方面实现有机高性能纤维性能的优化。进一步突破芳纶、超高分子量聚乙烯稳定化生产关键技术，提升纤维性能；开发新型有机高性能纤维，满足国防领域及民用领域需求。实现有机高性能纤维成型机理研究、性能提高关键技术突破，连续化生产技术控制、生产线各系统的自动化集成。

无机高性能纤维：系统研究无机高性能纤维前驱体聚合物的分子结构设计与合成、微结构设计与有机无机转化控制机制，结合应用领域对产品性能的具体需求，在建立完善无机高性能纤维试验基地的基础上，重点研究无机高性能纤维连续、稳定制备技术，从结构设计以及制备工艺等多方面实现无机高性能纤维性能的优化。进一步突破无机高性能纤维连续、稳定化生产关键技术，提升纤维性能；开发新型无机高性能纤维，满足国防领域及民用领域需求。

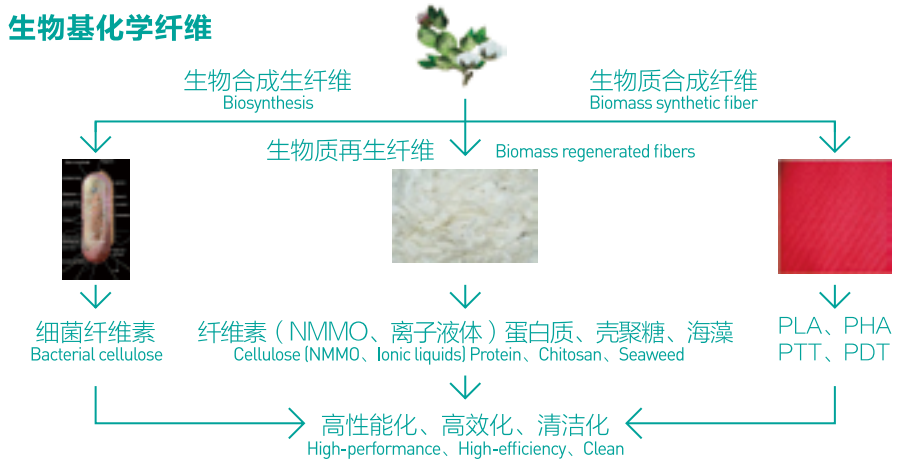
## 2. 新型聚酯与聚酰胺功能纤维

依托大容量聚合纺丝智能制造工程为基础，开发通用纤维多重改性柔性制备技术，提升纤维差别化与功能化品质，建立舒适健康、卫生保健、安全防护等领域的创新应用水平。通过对差别化功能化纤维关键技术及应用的突破，形成高仿真高品质化的功能复合纤维产业化链，提高产品的附加值，提升我国聚酯产业的竞争力。

提高聚酰胺纤维的差别化率，解决高品质聚酰胺原料不足问题；解决功能性无机粉体的表面多重修饰、原位聚合改性、低纤度异形聚酰胺高速纺丝与加工过程控制等关键技术，推动聚酰胺纤维制备规模化与低成本化、功能化、差别化及高性能化。

## 3. 生物基化学纤维

新型纤维素纤维：在我国现有 Lyocell 工艺法初步工程化、产业化的基础上，深入开展原创性的离子液体法、碱 / 尿






application basis of high-performance, low-cost and high-stability bases and basic applications, and develop carbon fiber production lines applicable to the demands of different fields based on the quality stability, performance improvement, continuous production and other key technological problems in the preparation process of carbon fibers. Achieve the continuous and stable operation, performance improvement and reduced cost of viscose-based carbon fiber production, provide support for the strategic weapons of national defense; realize high-strength and high-modulus PAN (Polyacrylonitrile)-based carbon fiber and large-scale stable production, to satisfy the demands of national defense area and other civil fields; realize the industrialized production of pitch-based carbon fibers to meet the demands of national defense.

Organic High-Performance Fibers: Comprehensive research on the shaping and control mechanism of organic high-performance fibers, achieve the optimization of organic high-performance fiber properties in various aspects of raw materials, structural design and preparation processes, combined with the specific demands of the application areas for the product performance. Further break through the key technology for stable production of aramid fiber and high-strength, high-modulus polyethylene fiber to improve the fiber properties; develop new organic high-performance fiber to meet the demands of national defense and civil fields. Achieve the research on shaping mechanism of organic high-performance fiber, the breakthrough of key technology for performance improvement, the control of continuous production technology and the integration of production line system automation.

Inorganic High-Performance Fibers: Systematically research on the control mechanism for molecular structure design and synthesis, micro-structural design and organic/inorganic conversion of the inorganic high-performance fiber precursor polymer, achieve the optimization of inorganic high-performance fiber properties in various aspects of structural design and preparation processes combined with the specific demands of the application areas for the product performance, with the emphasis on the research of continuous and stable preparation technology of inorganic high-performance fiber based on the establishment of test base for perfect inorganic high-performance fibers. Further break through the key technology for continuous and stable production of inorganic high-performance fiber to improve the fiber properties; develop new inorganic high-performance fiber to meet the demands of national defense and civil fields.

## 2. New Polyester and Polyamide Functional Fiber

Relying on the intelligent manufacturing engineering of large-capacity spinning as a basis, develop the multiple modification and flexible preparation technology of general fibers, improve the fiber differentiated and functional quality and establish an innovation application level of comfort and health, hygiene and care, and safety and protection and other areas. Form the high-simulation high-quality and functional composite fiber industry chain by breaking the key technology and application of differentiated and functional fiber through, to improve the product added value and enhance the competitiveness of the polyester industry of our country.

Improve the nylon fiber differentiation rate, solve the shortage of nylon raw materials; solve the multi-modified surface of functional inorganic powder body, in-situ polymerized modification, high-speed spinning of low-denier profiled nylon, processing cycle control and other key technologies, and promote the PA fiber preparation scale and low cost, function, differentiation and high performance.

## 3. Bio-based chemical fiber

New Cellulose Fiber: Implement in depth the original ionic liquid method, alkali/urea method and other basic researches based on the preliminary engineering and industrialization of existing Lyocell process in our country, to improve the international competitiveness of China in the area of new cellulose fiber science and technology. Develop new preparation technologies of cellulose fibers with international leading level, to realize the large-scale stable production. Further develop the preparation technologies of cellulose raw materials and use the appropriate preprocessing method to develop cellulose resources applicable to the spinning use to improve the utilization efficiency of the bagasse, bamboo, reed and other cellulose resources rich in China. Use the solvent method leaning production process to produce new cellulose fibers to replace the viscose fibers to a certain extent. Develop the raw materials of thermoplastic cellulose to achieve the cellulose derivative melt spinning.

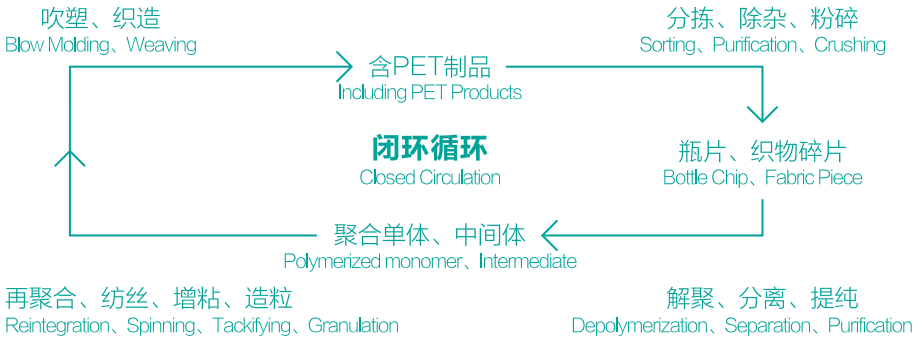
Bio-Based Polyester Fiber: Implement in

素法等基础研究，提升我国新型纤维素纤维科技的国际竞争力。开发具有国际领先水平的新型纤维素纤维制备技术，实现规模化稳定生产。进一步开发纤维素原料制备技术，采用合适的预处理方法开发适合纺丝用纤维素资源，加大我国富产的甘蔗渣、竹、芦苇等纤维素资源的利用效率。采用溶剂法清洁化生产工艺生产新型纤维素纤维，在一定程度上替代传统纤维素纤维。开发热塑性纤维素原料，实现纤维素衍生物熔融纺丝。

海洋生物基化学纤维：深入开展壳聚糖、海藻酸纤维等基础研究，形成具有原创性产业化技术，提升我国海洋生物基化学纤维科技的国际竞争力。开发纯海洋生物基化学纤维、海洋生物质复合纤维、改性海洋生物基化学纤维，掌握具有国际领先水平的海洋生物基化学纤维制备技术，实现规模化稳定生产。

生物蛋白质纤维：开发具有国际领先水平的生物蛋白质纤维制备技术，实现规模化稳定生产。利用生物工程和转基因

## 循环再生纤维




**服饰用**
Apparel
- 超细 Superfine
- 异形 Profile

**填充用**
Fiber fil
- 三维卷曲高回弹型 Three dimensional crimped HR fiber
- 高蓬松记忆型 High- loft Memory

**产业用**
Industrial
- 帐篷用 Tent
- 隔音板 Insulation board

生物基聚酯纤维：深入开展原创性的PDT（聚对苯二甲酸多元醇酯）纤维和PHBV（聚（3-羟基丁酸-co-3-羟基戊酸）纤维等基础研究，提升我国生物质聚酯纤维科技的国际竞争力。开发具有国际领先水平的生物质聚酯纤维制备技术，实现规模化稳定生产。突破生物基化学纤维非粮食原料低成本制备、用生物基化学纤维替代大品种石油基合成纤维、生物质合成纤维制备过程的低成本化等系列关键技术。

技术，实现蜘蛛牵引丝（拖丝）蛋白质的高效低成本生产和纺丝加工，生产医疗用和防护用超高强化学纤维。利用天然生物蛋白质微粒作为特殊用途产品的添加剂，生产人造血管、人造皮肤等医疗用纺织品或将天然生物蛋白质微粒作为其它化学纤维添加剂。

### 4. 循环再生纤维

发展废旧纺织品资源循环再生利用关键技术：扩大废旧纺织品回收利用范围，



depth the original PDT (polyterephthalic acid polyol ester) and PHBV fibers and other basic researches to improve the international competitiveness of China in the area of biomass polyester fiber technology. Develop the preparation technologies of biomass polyester fibers with international leading level, to realize the large-scale stable production. Break through the low-cost preparation of non-grain raw materials for bio-based chemical fibers, use the bio-based chemical fiber to replaces the large variety oil-based synthetic fiber, the low cost of preparation process of bio-based synthetic fibers and other key technology series.

Marine bio-based chemical fiber: Implement in depth the chitosan fiber, alginate fiber and other basic researches to form original industrialization technology, improve the international competitiveness of China in the area of marine bio-based chemical fiber technology. Develop the pure marine bio-based chemical fiber, marine biomass composite fiber, and modified marine bio-based chemical fiber, master the preparation technology of marine bio-based chemical fiber with international leading level, and realize the large-scale stable production.

Biological Protein Fiber: Develop the preparation technology of biological protein fiber with international leading level to realize the large-scale stable production. Use the biological engineering and transgenic technology to realize the high-efficiency and low-cost production, spinning and processing of spider dragline silk (dragline) protein to produce ultra-high-strength chemical fiber for medical use and protective use. Use the particles of natural biological protein as the additives of special-purpose products to produce artificial blood vessel, artificial skin and other medical textiles or use the particles of natural biological protein as the additives of other chemical fibers.

### 4. Regenerated Fiber

Development of Key Technology for Recycling and Regeneration of Waste Textile Resources: Expand the scope for recovering and reuse of waste textile, develop the technology for recovering and reuse of a variety of fiber products; achieve the classification and optimization of waste textile resources, broaden the regenerated products and their application scope, and expand the application field to the industrial use. Promote the sustainable development of the whole recycling industry of chemical fiber to build up a number of high-quality, multi-functional and low-energy-consumption chemical fiber - product - resource recycling economic demonstration bases. Form the environmentally-friendly and sustainable fiber renewable regeneration and recycling technologies to reduce the comprehensive energy consumption. Organize and formulate the standard system of recycled product quality, technology and clean production, encourage and regulate the development of chemical fiber regeneration and recycling industry. Explore the establishment of the business operation model of regeneration and recycling industry of chemical fiber with Chinese characteristics, strengthen the international cooperation, conduct brand construction from the raw materials and fibers to the products, promote the regenerated products, improve the corporate reputation, and promote the sustainable consumption of regenerated and recycled products of chemical fibers.

### 5. Nano Fiber

Overcome the bottlenecks in key technology for macro preparation of electrostatic spun

开发多种纤维制品的回收利用技术；实现废旧纺织品资源分类与优化，拓宽再生产品及应用范围，应用领域拓展到产业用等新领域。整体推进化纤循环产业的持续发展建成一批高品质、多功能、低能耗的化纤－制品－资源循环经济示范基地。形成环保、可持续的纤维回收再生与循环利用技术，降低综合能耗。组织制定回收再利用的产品质量、技术与清洁生产标准体系，鼓励和规范化纤再生与循环行业发展。探索建立有中国特色的化纤再生与循环产业商业运营模式，加大国际合作，从原料、纤维到制品进行品牌建设，对再生制品进行推广，提升企业信誉，推动化纤再生与循环产品可持续消费。

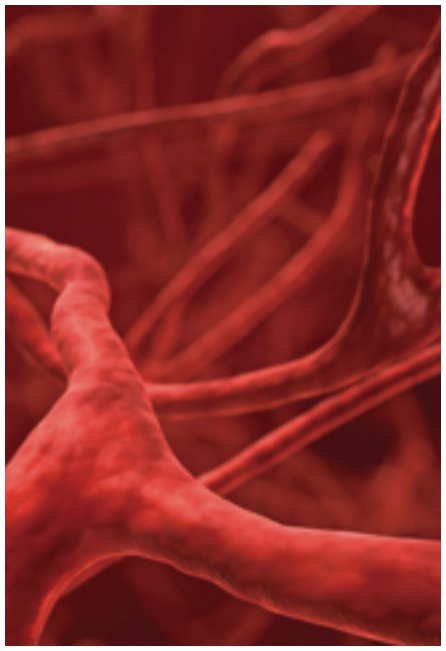
## 5. 纳米纤维

克服静电纺纳米纤维宏量制备关键技术瓶颈，包括射流组的可控固化、纤维质量的稳定控制、生产线各系统的自动化集成，开发具有国际领先水平的适用于不同规模需求的纳米纤维宏量制备生产线，实现纳米纤维的规模化稳定生产。

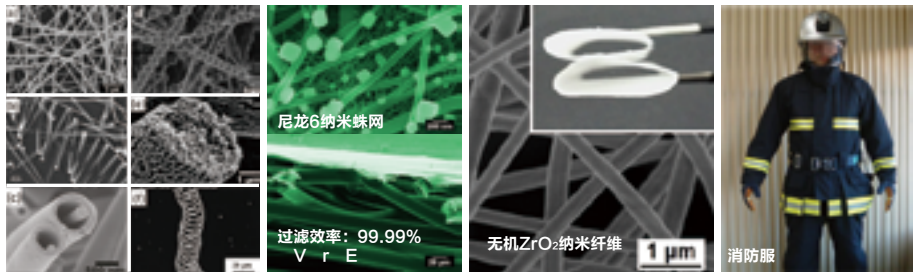
研究纳米纤维过滤膜结构与过滤性能的构效关系，调控纳米纤维生产过程，实现产品性能的稳定可控，满足不同类型空气过滤的需求。掌握纳米纤维膜三维曲孔结构的构筑与调控规律，优化纳米纤维功能层与常规纤维织物的复合工艺，保证功能层应用性能的稳定性。调控生物纳米纤维的体内降解，保证降解与组织生长相匹配。

nano fibers, including the controllable curing of jet set, stable control of fiber quality and automatic integration of production line systems, develop the production line for macro preparation of nano fibers with international leading level, applicable to the demands of different sizes to achieve the large-scale stable production of nano fibers.

Research on the structure-effect relation between nano fiber membrane structure and filtrating performance, adjust and control the nano fiber production process, achieve the stable and controllable product properties and meet the demands of different air filters. Master the rules for construction, adjustment and control of 3D curved-hole structure of nano fiber membrane, optimize the composite technology of nano fiber layer and conventional fiber fabric to ensure the stability of application performance of functional layer. Adjust and control the biological nano fiber degradation in vivo to ensure the degradation matches the tissue growth.



### 纳米纤维



# 三．化纤工业先进制造技术科技创新发展战略

### 1. 通用纤维
### ——智能融合、系统升级

高仿真全流程成型与智能制造技术：坚持数字化仿真与聚合、纺丝技术的高度融合，建立数字化研究平台与纺丝技术数字化平台，基于唯象工程模型、性能预测模型等，结合实际生产过程，实现全流程数字化控制，建立加工过程与品质优化专家系统。开发微量添加、有机无机原位共聚合、管道在线添加、纤维形态调控等模块化技术体系，对通用纤维进行综合改性，形成高品质差别化功能化的新产品开发与加工技术集成系统。根据后道应用与消费者多样化的需求，结合内部管理与市场营销等 ERP、大数据等管理系统，建立纤维产品设计与应用开发智能制造与管理系统。在纤维协同创新体系建设方面，发挥企业主体优势，配合高等院校、研究机构等的技术优势形成互动协同创新机制，形成差别化功能化纤维及制品的产业化联盟，加快推进差别化功能化纤维的开发与专业化应用，建立高效的新产品开发与推广平台；通过国际国内合作，多渠道引进人才，在差别化功能化纤维及其专业应用领域打造一支高效的协同创新队伍，不断拓展适用领域及扩展市场的份额，引领市场与品牌建设。

### 2. 高性能纤维
### ——品质先导、提升突破

满足国防军工需求，扩展高性能纤维在国防、航空、航天等高新技术领域的应用，拓展高性能纤维在过滤、纺织、包装等基础材料领域中的应用，实现高性能纤维及制品的低成本、高附加值，提升产品的竞争力。

开发完善碳纤维品种，形成自主知识产权碳纤维技术体系和装备体系，满足国防现代化建设稳定及规模化生产需求，并拓展碳纤维在民用领域中应用；形成自主创新芳纶完整技术体系，打造具备国际竞争力的产业链条；形成自主创新、稳定生产超高分子量聚乙烯完整技术体系，打造具备国际竞争力的产业链条；建立具备自主知识产权的其他有机高性能纤维如：聚酰亚胺、PBO（Poly-p-phenylene benzobisoxazole 聚对苯撑苯并二噁唑）以及 PPS（Polyphenyl sulfide 聚苯硫醚）等纤维产业化生产线，形成国际领先技术，并不断开发完善其它有机高性能纤维品种；完善无机高性能纤维品种，解决无机纤维稳定化、连续化生产制备过程中存在的科学及技术问题，具备一定的生产供货能力，满足国防军工需求。

### 3. 生物基化学纤维
### ——开拓资源、应用引领

实现新型生物基化学纤维在服装、家纺和产业方面的应用，满足人们对功能纺织品的需要；扩展新型生物基化学纤维在国防、航空、航天等高新技术领域的应用。



# 3. DEVELOPMENT TREND OF TECHNOLOGICAL INNOVATION OF ADVANCED MANUFACTURING TECHNOLOGY OF CHEMICAL FIBER INDUSTRY

### 1. Universal Fiber – Intelligent Integration, System Upgrading

Whole Process High Simulation Shaping and Intelligent Manufacturing Technology: Persisting in the high integration of digital simulation with polymerization and spinning technologies, establish digital platform for research and digital platform for spinning technology to achieve the digital control of full process and establish the expert system, combined with the actual production process based on the phenomenological engineering model, performance prediction model and other models. Establish the modification system integrated with trace addition, organic/inorganic in-situ polymerization, pipeline online addition, and fiber morphology adjustment and control to comprehensively modify the universal fibers, forming the high-quality differentiated functional preparation technology. Establish the intelligent fiber system based on the next application and customer demands for diversities, combined with the internal management and marketing and other ERP, big data and other management systems.

Fiber Cooperative Innovation System: Play the main body advantage of the enterprises, work in with technological advantages of colleges and universities to form a new interactive collaboration and innovation mechanism, form the industrialized alliance of differentiated functional chemical fiber and its products to accelerate the development and application of differentiated functional fibers and establish a high-efficiency incentive mechanism. Create a new efficient collaboration and innovation team in the differentiated functional fiber and its professional application areas to lead the market, continue to expand shares of applicable areas and the expanded markets.

### 2. High-Performance Fiber – Quality Pilot, Improvement Breakthrough

In order to meet the demands of national defense, extend the application of high performance fibers in national defense, aviation, aerospace and other high-tech areas, expand the application of high-performance fibers in filtration, textile, packaging and other basic material fields to achieve the low cost and high added value of high performance fibers and products, and enhance the product competitiveness.

Develop and improve the carbon fiber varieties to form the carbon fiber technology system and equipment system with independent intellectual property rights, meeting the demands of stable and scaled production for construction of national defense modernization, and expanding the application of carbon fibers in civil areas; form the complete technological system of independently innovated aramid fibers to build up the industrial chain with international competitiveness; form a complete technological system for independent innovation and stable production of high-strength and high-modulus polyethylene to build up the industry chain with international competitiveness; establish the industry lines of other organic high-performance fibers with independent intellectual property rights, such as polyimide fibers, PBO (Poly (p-phenylenebenzobisoxazole) ) fibers and PPS (Polyphenyl sulfide) fibers to form the international leading technology, and continuously develop and improve other high performance organic fiber varieties; improve the inorganic high-performance fibers to solve the scientific and technological problems existed in the process of stable and continuous production and preparation of inorganic fibers with a certain production and supply capacity to meet the needs of national defense.

### 3. Bio-based chemical fiber –Expand Resource, Application Leading

Realize the application of new bio-based chemical fibers in clothing, home textile and industry to meet the needs of the customers for functional textiles; expend the application of new bio-based chemical fibers in national defense, aviation, aerospace and other high and new technology fields.

High-efficiency low-energy-consumption processing and comprehensive utilization technology: create the demonstration and production bases for preparation of bio-

高效低能耗预处理和综合利用技术：建立以棉短绒、竹、木、麻和秸秆为原料制备生物基化纤和生化原料的示范化生产基地。逐步对现有生产企业的生产工艺和装备进行改造，促进我国现有生物基化纤企业的生产方式向清洁化、环保化、低温、低成本、零排放方向转变。优化水解法循环处理技术，解决连续亚临界喷爆、环保、高纯度分离“三素” 技术与装备的难题；攻克绿色催化提取技术与生物法选择性提取工艺相衔接的技术。

改造现有的溶解浆工艺，全面提高现有溶解浆的质量；采用浆粕活化技术，低CS2、低碱比、高甲纤粘胶制备技术，提高纺丝溶液的浓度及纤维的力学性能。溶剂法纤维素纤维生产工艺有所突破，形成制浆—纤维一体化溶剂法纤维素纤维生产线。研究离子液体等纤维素新溶剂，形成制浆—纤维一体化离子液纤维素纤维生产线。

研究低成本高熔点 PLA 的制备新工艺研究，为 PLA 纤维降低成本和进一步提高力学性能奠定基础。优化 PHBV 发酵工艺，研究原料的纯度、相对分子质量大小及其分布的控制，PHBV 结构的设计、纤维的性能与成形过程凝聚态结构的构筑和分散相形态控制以及 PHBV 的共混改性，形成改善 PHBV 纤维的力学性能的关键技术。

研究壳聚糖的新溶剂、新溶解工艺及甲壳素 / 纤维素纤维的干－湿法成型理论和方法，形成有效改善壳聚糖的溶解性能、提高壳聚糖纤维和甲壳素 / 纤维素纤维纺丝溶液的浓度和纺速及纤维的力学性能的关键技术。

研究纤维级海藻酸钠的筛选、提取和分类，海藻纤维耐碱性和稳定性技术，形成海藻纤维纺丝成套工艺及专用成套设备。通过鲜海藻固体原料转化技术，实现高浓度“液晶”纺，大幅度提高海藻纤维力学性能。

改进现有大豆蛋白复合纤维生产技术，提高纤维力学性能。研究动物皮毛下脚料提取胶原蛋白复合纤维工程化技术。

### 4. 循环再生纤维<br>——自主创新、综合利用

突破废旧纺织品循环再利用化学法关键技术瓶颈，实现化纤“从摇篮到摇篮”的多级多次闭环循环体系。建立相关法律法规及循环再生制品的安全认证，规范循环再生纺织品市场，实现我国化纤工业绿色和可持续发展。

自主开发物理化学法、化学法高效连续生产再生纤维关键技术体系，包括废旧纺织品预处理与分离技术、再生原料资源化技术、再生纺丝技术、再生制品技术和再生体系及产品认证技术等，同时结合废料与市场需求，设计并建立专业的再生化纤产品梯度循环体系，达到废而不废、废而不差、废而更优的效果。

展望未来，中国纤维产品与质量、高技术产业用纤维比重与规模等快速发展，纤维内涵建设与创新深度融合，产品结构与附加值、市场美誉度与品牌相得益彰；绿色与智能制造技术高度融合，劳动力、资源与环境约束严重缓解，成为中国纤维发展新兴动力，成为我国战略性新兴产业的重要组成部分；我国纤维新材料的发展不仅是支撑纺织工业整体创新与提升竞争力的重要元素，而且为我国建筑、能源、交通、资源、环保等新兴领域的建设、结构调整和产业升级都有着强劲地推动作用。



based chemical fibers and biochemical raw materials with cotton linter, bamboo, wood, hemp and straw as raw materials. Gradually transform the existing production technology and equipment of the production enterprises, promote the changes of the production mode of our existing bio-based chemical fiber enterprises to the direction of clean, environmentally-friendly, low temperature, low cost and zero emission. Optimize the hydrolytic method recycling and processing technology to solve the difficulties of continuous subcritical spraying and blasting, environmentally-friendly and high-purity "Three-Factor" separation technology and equipment; wade through the convergence technology of green catalytic extraction technology and biological method selective extraction technology.

Transform the existing dissolving pulp process to comprehensively improve the quality of existing dissolving pulps; use the pulp activation technology and low CS2, low alkali ratio, high viscose fiber preparation technology to improve the concentration of spinning solution and mechanical property of fibers. The production technology of solvent method cellulose fibers has a certain breakthrough to form the pulping - fiber integrated solvent method cellulose fiber production line. Research on the ionic liquid and other new cellulose solvents to form the pulping - fiber integrated ionic liquid cellulose fiber production line.

Research on the new low-cost high-melting-point PLA preparation technology that has laid the foundation to reduce the cost and further improve the mechanical properties of the PLA fibers. Optimize the PHBV fermentation process, research on the purity of raw materials, relative molecular weight and the control of its distribution, the PHBV structural design, fiber properties, formation of the condensed-status structure in forming process, morphology control of dispersed phase and PHBV blending modification, to form the key technology to improve the mechanical properties of PHBV fibers.

Research on the new solution and new dissolving technology of chitosan, as well as dry-wet shaping theory and method of chitin / cellulose fibers, to form the key technology to effectively improve the dissolving performance of chitosan, improve the concentration of chitosan fiber and chitin/cellulose fiber spinning solutions and the spinning speed, and the mechanical properties of the fibers.

Research on the screening, extraction and classification of fiber-grade sodium alginate, and the alkali resistance and stability technology of the seaweed fibers to form the seaweed fiber spinning process set and special equipment set. Use the fresh seaweed solid raw material conversion technology to realize the high-concentration "Liquid Crystal" spinning that greatly improves the mechanical properties of seaweed fibers.

Improve the existing soybean protein composite fiber production technology to improve the mechanical properties of fibers. Research on the engineering technology to extract the collagen composite fiber from the animal fur scraps.

### 4. Regenerated Fiber<br>– Independent Innovation,<br>Comprehensive Utilization

Achieve the multilevel and multiple closed-loop recycling system of the chemical fibers "From Cradle to Cradle", break the technological monopoly of foreign enterprises in terms of recycled polyester industry. Expand the production scale of regenerated fibers to form regenerated fiber industrial cluster. Establish the relevant laws and regulations and the safety certification of regenerated products, regulate the regenerated textiles market, and promote the establishment and improvement of the completion of circular economy in China's chemical fiber industry to achieve the revitalization of China's chemical fiber industry and the construction of sustainable development road.

Independently develop the key technology system of physical-chemical method, chemical method waste polyester fiber continuously regenerated fibers, including the waste textile preprocessing and separation technology, regenerated raw material resourcing technology, regenerating and spinning technology, regenerated product technology, regenerating system and product certification technology and other technologies, and at the same time, design and establish the professional gradient recycling system of regenerated fiber products, combined with the waste materials and market demand, to achieve the effect of waste but is not wasted, waste but is not bad and waste is better.

Looking forward to the future, the China fiber products and quality, the proportion and scale of fibers used for high-tech industry will be developed rapidly, the fiber connotation construction and innovation will be integrated in depth, and the product structure and added value, the market reputation and brand will be complemented each other; the green and intelligent manufacturing technology will be integrated in depth, the constraints of labor force, resources and environment will seriously release the constraints and become a new power for development of China fibers and an important part of China's strategic emerging industries; the development of new fiber materials in China is not only an important element supporting the overall innovation and enhance the competitiveness of the textile industry, but also has a strong promoting effect for the construction, structural adjustment and industrial upgrading of China's building, energy, transportation, resources, environmental protection and other emerging fields.

# 颠覆与重塑

# SUBVERSION & REMODELING

## 颠覆

颠覆不是抗衡批判，也不是否定前期的所有成果，它是指在原创思维基础上的重大创新，代表了在某一领域的另辟蹊径，创造新的价值。面对创新驱动发展战略，提升国际竞争力的新形势，中国制造更加注重创新活力和提质增效，更加勇敢的对习惯思维与模式进行颠覆。中国纤维立足现在，放眼未来，不盲目追从，通过创新，突破原有的框架，催生出新技术、新产品、新生态，打破一切价值预设，完全蜕变为一种全新的价值链。

**原料颠覆:**

众所周知,牛奶、玉米是人们重要的食物，虾蟹壳是废弃物，中国纤维另辟蹊径，从这些食品、农林等废弃物中提取资源，制备性能优异、亲肤舒适、可降解的纤维，开辟了生物基化学纤维的新路径，实现了绿色循环。

**工艺颠覆:**

突破原有的生产工艺,开发多重在线添加、化学物理法循环再利用、不对称纺丝成型等原创技术，制备无染纤维、幻彩纤维、舒感纤维。同时纤维生产效率更高、更绿色环保。

**应用颠覆:**

纤维都有自己特定应用领域，聚酰亚胺用于高温过滤、石墨烯用于光电材料，随着纤维应用科技的创新，聚酰亚胺纤维、石墨烯纤维服装成功推向市场，拓展了市场领域，实现多元化发展。

# 重塑

绿色制造、智能制造、互联网 +、大数据等既是机遇也是冲击，我们要从根本上反思传统的价值创造与价值获取方式，以终端服务商与消费者角度，重塑企业理念、产品内涵以及价值链体系，全面扩展时间、成本、能源的空间，获得新的发展机遇。

**理念重塑:**

打破化纤行业传统运行与发展模式，更加注重以人为本、社会责任理念。通过全价值链的竞争与合作，全面实施智能化制造，降低劳动强度与生产成本，提升竞争力。开发节能、绿色、低碳的新技术、新工艺、新装备和新材料，提质增效，实现可持续发展。

**产品重塑:**

纤维产品不仅关注其性能与功能，而且更加关注人体亲和、环境友好等理念。研发功能护理纤维、功能亲肤纤维、循环再生纤维、生物基化学纤维，引领服装、医卫领域发展；研发高强高模、耐高温、耐腐蚀材料，支撑安全防护、高温过滤、工程增强等领域发展，重塑化纤产品内涵。

**价值重塑:**

纤维制造不仅关注纤维的品质与功能，更加注重终端消费品的价值体现，通过竞争与合作，提供全套解决方案，全方位满足客户需求，提高企业的生产效率和抗风险性，在实现自我发展的同时重塑新的产业链价值。



## SUBVERSION

The subversion is not a counter criticism, nor to deny all the prophase achievements, but refers to the major innovation on the basis of original thinking, representing the new path opened in a field to create a new value. In the face of the new situation of innovation-driven development strategy and enhancement of the international competitiveness, the made-in-China pays more attention to innovation vitality and improvement of quality and efficiency, and requires more bravery to subvert the habit of thinking and mode. The fibers in China breaks through the original frame to hasten the creation of new technology, new product and new ecology through innovation, and breaks all preset values to completely undergo metamorphosis into a new value chain based on the present, looking to the future but with no blind pursuit.

Subversion of Raw Materials:As we all know, the milk and corn are our most important foods and the shrimp and crab shells are wastes, so a new path is opened for the fibers in China to extract resources from these foods, agricultural and forestry wastes, to make excellent-performance, comfortable and skin friendly, biodegradable fibers that opened up a new path for bio-based chemical fibers and realized the green recycling.

Subversion of Processes:The conventional production processes shall be broken through to develop original technologies including multiple online additions, chemical and physical recycling, and asymmetric spinning formation, and to prepare spun-dyed fiber, colorful fiber and comfort fiber. At the same time, the fiber production efficiency becomes higher, greener and more environmentally-friendly.

Subversion of Applications:Any fiber has its own specific field of application, the polyimide is used for high temperature filtration and the graphene is used for optoelectronic materials, and with the technological innovation of fiber applications, the polyimide fiber and graphene fiber clothing has been successfully pushed to the market and expanded the field of market and achieved the diversified development.

## REMODELING

The green manufacturing, intelligent manufacturing, Internet+, big data and others are both an opportunity and an impact, therefore we should rethink fundamentally about the ways for traditional value creation and value acquisition, reshape the business conception, product connotation and value chain system from the point of view of end service providers and consumers, and fully expand the time, cost and energy spaces to obtain new development opportunities.

Remodeling of Conception:The traditional operation and development modes of chemical fiber industry shall be broken through to pay more attention to the concept of people-oriented social responsibility. Fully implement the intelligent manufacturing through competition and cooperation of the whole value chain to reduce the labor intensity and production costs, and enhance the competitiveness. Develop the energy-saving, green and low-carbon new technologies, new processes, new equipment and new materials, and improve the quality and efficiency to achieve the sustainable development.

Remodeling of Products:The fiber products shall be paid not only more attention to their performance and function, but also much more attention to the human body friendly and environmental protection concept. Research and develop the functional nursing fiber, functional skin-friendly fiber, regenerated fiber and bio-based chemical fiber to lead the development of clothing, medical and health fields; research and develop the high-strength, high-modulus, high temperature resistant and corrosion resistant fiber materials to support the development of safety, high temperature filtration, engineering enhancement and other fields to remodel the connotation of the chemical fiber products.

Remodeling of Value:The fiber manufacturing shall be paid not only more attention to the fiber quality and function, but also much more attention to the value realization of the end consumer products, to provide a full set of solutions through competition and cooperation to meet the customer demand in full range, and improve the production efficiency and anti-risk capacity of enterprises, to both realize the self-development and reshape the new industry chain value.


# 中国纤维流行趋势
# 2016 / 2017
# CHINA FIBERS FASHION TRENDS REPORT

纤维制品是人体的第二皮肤，在蔽体、保暖、舒适的同时，也注重人体亲和、透气等功能，给予婴幼儿、老人、女性贴心的呵护。本篇章纤维通过科学的全方位设计与优化，保证产品无刺激、无致敏（杂质含量低、重金属含量低、化学品含量低、零疵点），实现分子水平上的呵护。纤维的高品质和功能性给消费者以极致的舒感、细致入微的呵护，给生活带来了便捷、创新与惊喜，更表达了中国纤维以人为本的人文关怀。

The fiber product is the second skin of the human body not only to cover, warm and comfort the human body, but also to pay attention to the human body affinity, air permeability and other functions giving intimate care to the infants, elders and women. The fibers in this chapter ensures the products free of irritation and sensitization (low impurity content, low heavy metal content, low chemicals content and zero defect) through scientific design and optimization in all aspects to realize the care at molecular level. The high quality and functionality of the fibers provides the consumers with ultimate comfortable feeling and meticulous care, bring the life convenience, innovation and surprise, and moreover express the people-oriented humanistic care of the fibers in China.

# 一 . 功能护理纤维

## 1.1 推荐理由

功能护理纤维采用最严格的指标控制，创新的使用独特的复合技术，颠覆传统工艺，设计特殊的微观与形态结构，打造人体第二皮肤。无刺激、无致敏，高度亲和；蓬松、柔软、干爽、透气，让肌肤自然呼吸；天然抑菌，维护皮肤清洁卫生，给消费者最专业（婴儿级）的关爱!

## 1.2 制备技术

**(1)卫材级双组份复合纤维：**

采用切片复合纺丝法进行制备

主要规格：

1.11~13.32dtex×38mm

产品标准：

《聚乙烯 / 聚丙烯（PE/PP）复合纤维》（FZ/T52025-2012）、《聚乙烯 / 聚对苯二甲酸乙二醇酯（PE/PET）复合短纤维》（FZ/T 52034-2014）、《聚乙烯 / 聚丙烯（PE/PP）增白复合纤维》（FZ/T 52033-2014）

**(2)卫材级聚乳酸复合纤维：**

采用熔体直纺、复合纺丝法进行制备

主要规格：

1.67dtex×38mm

产品标准：

参照标准《聚乙烯 / 聚丙烯（PE/PP）复合纤维》（FZ/T52025-2012）

**(3)卫材级再生纤维素复合纤维：**

采用再生纤维复合纺丝法进行制备

产品规格：

1.67dtex×38mm

产品标准：

参照标准《粘胶短纤维》（GB/T 14463-2008 ）



# 1. FUNCTIONAL NURSING FIBER

## 1.1 Reason to recommend

The functional nursing fiber adopts the most stringent quality control and creatively uses the unique composite technology to subvert the traditional process and design the special micro-morphological structures so as to create the second skin of the human body. It has no irritation and no sensitization, but high affinity; it is fluffy and soft, dry and permeable, allowing the skin breathes freely; it is naturally antibacterial and bacteriostatic, maintaining the skin clean and healthy, and gives the consumers most professional care (as to a baby).

## 1.2 Preparation technology

**(1) Eisai-level two-component composite fiber:** it is prepared by using the chip composite spinning method

Main specification:

1.11 - 13.32dtex×38mm

Product standard:

"Polyethylene / Polypropylene (PE/PP) Composite Fibers" (FZ/T52025-2012), "Polyethylene / Polyethylene Terephthalate (PE/PET) Composite Staple Fibers" (FZ/T 52034-2014), and "Polyethylene / Polypropylene (PE/PP) Whitening Composite Fibers" (FZ 52033-2014)

**(2) Eisai-level poly-lactic acid composite fiber:** it is prepared by using the melt directly spinning, composite spinning method.

Main specification:

1.67dtex×38mm

Product standard:

refer to the standard "Polyethylene / Polypropylene (PE/PP) Composite Fiber" (FZ/T52025-2012)

**(3) Eisai-level regenerated cellulose composite fiber:** it is prepared by using composite spinning method of regenerated cellulose fiber.

Main specification:

1.67dtex×38mm

Product standard:

refer to the standard "Viscose Staple Fibers" (GB/T 14463-2008)

## 1.3 特点及用途

(1)卫材级双组份复合纤维：

主要成分为 PE/PP 和 PE/PET，分皮芯结构和中空结构，可具有三维立体卷曲，高蓬松性，高覆盖性，手感柔软舒适。主要用于尿不湿和卫生巾等产品。

(2)卫材级聚乳酸复合纤维：

生物降解，抑菌性，皮芯结构，皮层为低熔点聚乳酸，芯层为普通聚乳酸。可制成热风、热轧无纺布，用于可吸收型一次性医卫材料。

(3)卫材级再生纤维素复合纤维：

具有抗氧化性、抑菌性。用于内衣、袜子、家纺、面膜、卫生巾、湿巾、医用绷带等领域。

## 1.4 应用技术

(1)卫材级双组份复合纤维：

热风、热轧粘合式无纺布。

(2)卫材级聚乳酸复合纤维：

热风、热轧粘合式无纺布。

(3)卫材级再生纤维素复合纤维：

卫材级再生纤维素复合纤维：建议与再生纤维素纤维、棉、莫代尔混纺，不低于 30% 含量，染色工艺与再生纤维素纤维一致，尽量保持酸性，ph 值不能高于 7.8，定型温度不能高于 180℃。

## 1.5 关注品种

壳聚糖纤维、竹炭纤维、抑菌防臭聚酰胺纤维。



## 1.3 Features and applications

**(1) Eisai-level two-component composite fiber:** the main components are PE/PP and PE/PET. The fiber exhibits skin-core structure or hollow structure, and can have three-dimensional crimp, high bulkiness and high coverage with soft and comfortable feelings. It is mainly used for diapers/pampers, sanitary towels and other products.

**(2) Eisai-level poly-lactic-acid composite fiber:** biodegradation, bacteriostatic property and skin-core structure, of which the skin layer is made of low melting-point poly-lactic acid, while the core layer is made of ordinary poly-lactic acid. It can be made into hot air, calender-bonded nonwoven cloth for absorbable and disposable medical materials.

**(3) Eisai-level regenerated cellulose composite fiber:** it has oxidation resistance and bacteriostatic property. It is used for underwear, socks and home textiles, masks, sanitary towels and wet wipes, medical bandage and other fields.

## 1.4 Application technologies

**(1) Eisai-level two-component composite fiber:** hot air and calender-bonded nonwoven fabrics.

**(2) Eisai-level poly-lactic acid composite fiber:** hot air, calender-bonded nonwoven fabrics.

**(3) Eisai-level regenerated cellulose composite fiber:** blending with regenerated cellulose fiber, cotton and modal is recommended, of which the content shall not be less than 30%, the dyeing process shall be consistent with the regenerated cellulose fiber, and as far as possible to maintain the acid, and the maximum PH value should not be higher than 7.8 and the setting temperature should not be higher than 180°C.

## 1.5 Varieties concerned

Chitosan fiber, bamboo charcoal fiber, bacteriostatic deodorant polyamide fiber.

# 二 . 功能亲肤纤维

## 2.1 推荐理由

功能亲肤纤维采用新型的生物基功能材料，与传统纤维共混或共聚，改变已有纤维分子结构，精心设计、匠心打造，提升产品功能与理念，创新与应用结合，亲肤与功能融合，实现纤维完美升级。具有抗静电、远红外、防紫外线、抑菌、高透气、高阻燃等功能，让人们尽享舒适与健康。

## 2.2 制备技术

**(1)生物质石墨烯内暖再生纤维素纤维：**

生物质石墨烯通过表面修饰与改性，与再生纤维素共混形成均匀分散体系，经湿法纺丝，制备出功能化石墨烯复合纤维。

主要规格：

1.33 dtex×38mm

产品标准：

《生物质石墨烯纤维》
（Q/370000JSQ009-2016）

**(2)高吸湿发热聚丙烯腈纤维：**

丙烯基－聚丙稀腈共聚经湿法纺丝制备出高吸湿发热聚丙烯腈纤维。

主要规格：

1.67~2.75dtex×38mm

产品标准：

制品参考《吸湿发热针织内衣》
（ FZ/T 73036-2010 ）



# 2. FUNCTIONAL SKIN-FRIENDLY FIBER

## 2.1 Reasons to recommend

The functional skin-friendly fiber uses new bio-based functional materials to blend or polymerize with the traditional fibers to change the existing molecular structure of the fiber, enhance the product functionality and philosophy through elaborate design and artistic creation, and realize the perfect fiber upgrading through combination of innovation with application and integration of skin affinity with function. It has antistatic, far-infrared, anti-ultraviolet, bacteriostatic, high-permeable, high-flame-retardant and other functions, allowing people enjoy the comfort and health.

## 2.2 Preparation technology

**(1) Bio-based graphene heat-generation regenerated cellulose fiber:** the bio-based graphene is blended with regenerated cellulose into a homogeneous dispersion system by surface finishing and modifying, and forms the functional graphene composite fibers by wet spinning process.

Product specification:

1.33 dtex×38mm;

Product standard:

"Biomass Graphene Fiber" (Q/370000JSQ009-2016)

**(2) Highly hygroscopic heat generation poly-acrylonitrile fiber:** Propylene-based poly-acrylonitrile copolymer is prepared by wet spinning process.

Main specification:

1.67 - 2.75dtex×38mm

Product standard:

for products, refer to the standard "Hydroscopic Heat Generation Knitted Underwear" (FZ/T 73036-2010)

**(3) Antibacterial warm copper alginate fiber:** prepared with the sodium alginate extracted from brown algae as raw material, with the water as solvent and the copper dichloride or copper sulfate aqueous solution as coagulation bath by wet spinning process.

Main specification:

0.5 - 1.8dtex×38 - 51mm

Product standard:

refer to the standard "Viscose Staple Fiber" (GB 14463-2008-T)

(3)抑菌保暖海藻酸铜纤维：

从褐藻中提取海藻酸钠为原料，以水为溶剂，氯化铜或者硫酸铜水溶液为凝固液，经过湿法纺丝工艺制备。

主要规格：

0.5~1.8dtex×38~51mm

产品标准：

参照标准《粘胶短纤维》
（GB 14463-2008-T）

## 2.3 特点及用途

(1)生物质石墨烯内暖再生纤维素纤维：

具有抗静电、远红外、防紫外线、抑菌等功能。可用于服装、婴幼儿产品、床上用品、围巾、帽子、毛巾、护具等。

(2)高吸湿发热聚丙烯腈纤维：

具有高吸湿、高透气、高阻燃、抑菌等性能。用于内衣、家纺及面膜等贴肤类产品。

(3)抑菌保暖海藻酸铜纤维：

具有远红外、天然抑菌功能，纤维还原了铜离子原本的亮蓝色彩。用于医卫材料、抑菌织物、远红外保健材料等领域。

## 2.4 应用技术

(1)生物质石墨烯内暖再生纤维素纤维：

采用赛络紧密纺技术，可纯纺或混纺。

(2)高吸湿发热聚丙烯腈纤维：

可用于针织面料和填充料。在针织面料中，主要与纤维素纤维或棉混纺成纱线，最终面料高吸湿发热聚丙烯腈纤维含量在 15% 左右，可单面和正面反交织；在填充料中，高吸湿发热聚丙烯腈纤维主要与涤纶共混，最终絮片高吸湿发热聚丙烯腈纤维含量为 20%~30%。染整时，面料可以按其混纺比高的成分设定工艺（如 20% 高吸湿发热聚丙烯腈纤维配 80% 棉，可按照棉的染整工艺）。高吸湿发热聚丙烯腈纤维在酸性和活性颜料中是不上色的；染色过程中忌烧碱，后处理需要加亲水性柔软剂。

(3)抑菌保暖海藻酸铜纤维：

可用于纺纱、水刺 / 针刺无纺布、热风无纺布。

## 2.5 关注品种

氧化亚铜抑菌吸湿排汗聚酰胺 6 纤维、抑菌抗紫外凉感聚酯纤维，负离子异型聚酯纤维。



## 2.3 Features and applications

(1) Bio-mass graphene regenerated cellulose fiber: it has antistatic, far infrared, anti-UV and antibacterial functions. It can be used for clothing, baby products, bedding, scarves, hats, towels and other protective gears.

(2) Highly hygroscopic heat generation poly-acrylonitrile fiber: it has high hygroscopic, high permeable, high flame retardant, natural antibacterial and other properties. It is used for underwear, home textiles, facial masks and other skin-touch products.

(3) Antibacterial warm copper alginate fiber: it has far infrared, antimicrobial functions, and the fiber is restored to its original blue color of copper ion. It is used for medical and healthy materials, antibacterial fabrics, far infrared health care materials and other fields.

## 2.4 Application technologies

(1) Bio-mass graphene regenerated cellulose fiber: it can be directly spun or blended by using the compact spinning technology.

(2) Highly hygroscopic heat generation poly-acrylonitrile fiber: it can be used for knitted fabric and filling material. In the knitted fabrics, it is mainly blended into yarn with cellulose fiber or cotton to make the fabrics contain highly hygroscopic heat generation poly-acrylonitrile fiber of about 15% finally by single-sided and face-back cross-weaving; while in the filling material, the highly hygroscopic heat generation poly-acrylonitrile fiber is mainly blended with polyester to make the flocculars contain highly hygroscopic heat generation poly-acrylonitrile fiber of 20% - 30% eventually. When dyeing and finishing, the process can be set based on the component of the fabric that has higher blending ratio (for example, the cotton is accounted for 80% in the 20% highly hygroscopic poly-acrylonitrile fiber, so the process can be set based on the cotton). The highly hygroscopic heat generation poly-acrylonitrile fiber can not be dyed in the acid and active pigment; the use of caustic soda in the dyeing process is prohibited; and the addition of hydrophilic softener is required for post-processing.

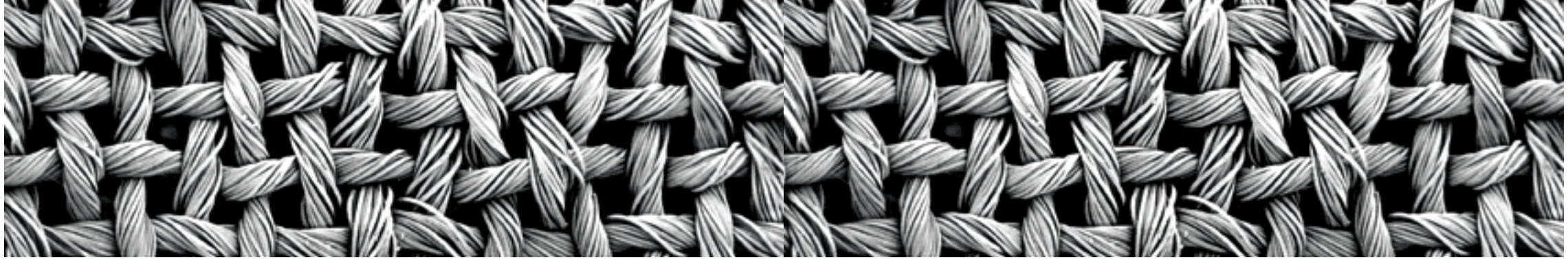
(3) Antibacterial warm copper alginate fiber: it can be used for spinning, spunlace / needle-punched nonwoven fabrics, hot air nonwoven fabrics.

## 2.5 Varieties concerned

The cuprous oxide bacteriostatic hygroscopic polyamide 6 fiber, bacteriostatic anti-UV cool-feeling polyester fiber, negative-ion profiled polyester fiber, selenium-rich regenerated cellulose fiber and ecological bacteriostatic spun-dyed polyester fiber.


人与自然的和谐在于人类享受科技文明成果的同时，自觉维护大自然。中国纤维发展越来越重视原料来源绿色、加工过程绿色、产品废弃后循环利用或可降解，全生命周期构建绿色产业链，全方位展示亲民、负责任的形象，推动产业绿色发展。在提供高品质纤维的基础上，开启我们与环境生息共存的绿色模式。

The harmony between human and nature is that the human enjoys the achievements of scientific and technological civilization while consciously safeguarding the nature. The fiber development in China pays more and more attention to the green sources of raw materials, the green processing process and the product waste recycling to build up a green industry chain in whole life cycle, demonstrate a populist and responsible image, to promote the development of green industry. On the basis of provision of high-quality fibers, open the green mode in which we coexist with the environment.



# 一．循环再生纤维

### 1.1 推荐理由

物尽其用，人尽其才是社会发展的永恒目标，制造业的发展永远在追求最低的付出和最大的产出,纤维产业率先示范,追求资源与环境的和谐。循环再生纤维颠覆传统原料来源，就地取材，对废弃资源进行综合利用，制造出媲美于原生品质的新型功能纤维，在满足消费者高端需求的同时，极大地减轻了废旧纺织品对环境造成的压力，实现循环、低碳与高附加值的统一。

### 1.2 制备技术

**(1)防泼水循环再生聚酯纤维：**

采用“ECO CIRCLE™”化学法循环再生法，以回收的旧衣物、废丝为原料生产循环再生聚酯纤维。

主要规格：

83dtex/72f

产品标准：

《涤纶预取向丝》
（FZ/T 54003-2004）
《涤纶低弹丝》
（GB/T 14460-2008）
《再生纤维》
（Q/JRZL01-001）

**(2)低熔点循环再生聚酯复合纤维：**

皮层为醇解改性的再生聚酯切片，芯层为PET 瓶片或废旧纺织品熔融后经液相增粘，经复合纺丝制成。

主要规格：

3.33~4.44dtex×51~64mm

产品标准：

参照标准
《聚乙烯 / 聚对苯二甲酸乙二醇酯（PE/PET）复合短纤维》
（FZ/T 52034-2014）

**(3)多功能循环再生聚酯纤维：**

将聚酯瓶分拣去除金属及无机杂质，高温清洗,去除有机杂质,制成洁净的聚酯瓶片，经造粒、熔融共混纺丝制成单组份多功能循环再生聚酯纤维。

主要规格：

1.33~12.22dtex×33~300mm

产品标准：

《涤纶短纤维》
（GB/T 14464-2008 ）



# 1. REGENERATED FIBER

### 1.1 Reasons to recommend

To make the best possible use of everything and give full scope to the talents is the eternal goal of social development, and the development of manufacturing industry pursues always the lowest cost and maximum output, for which the fiber industry takes the lead in demonstration to seek the harmony of resources with environment. The recycled and regenerated fibers that subverted the traditional sources of raw materials, use the local materials, comprehensively utilize the waste resources and produce the new functional fiber comparable to the original quality that greatly reduces the pressure caused to environment by the waste textiles so as to achieve the unity of the recycling and low carbon with the high added value on the premise of meeting the high-end demand of the consumers.

### 1.2 Preparation technology

**(1) Water repellent regenerated polyester fiber:**it uses "ECO CIRCLE" chemical regenerating method to produce recycled polyester fiber with the recycled old clothes and waste yarn as raw materials.

Main specification:

83dtex/72f

Product standard:

"Pre-Oriented Yarn" (FZ/T 54003-2004), "Polyester Drawn Textured Yarn" (GB/T 14460-2008), "Recycled Fiber" (Q/JRZL01-001)

**(2) Low-melting-point regenerated polyester composite fiber:** The skin layer is made of alcoholysis modified regenerated polyester chips and the core layer is made of PET bottle flakes or made by liquid-phase tackifying and composite spinning of the melted waste textile.

Main specification:

3.33 - 4.44dtex×51- 64mm

Product standard:

refer to the standard "Polyethylene/ Polyethylene Terephthalate (PE/PET) Composite Staple Fiber" (FZ/T 52034-2014)

**(3) Multifunctional regenerated polyester fiber:**it produces the on-component of multifunctional regenerated polyester fiber by granulating and melt blending spinning with the clean polyester bottle flakes made by sorting the polyester bottles out to remove the metal and inorganic impurities and by high temperature cleaning to remove the organic impurities.

Main specification:

1.33 -12.22dtex×33 - 300mm

Product standard:

"Polyester Staple Fibers" (GB/T 14464-2008)

(4)有色循环再生聚酯纤维：

全部使用聚酯无纺布、纺织品的废料、聚酯废块、废聚酯膜、废聚酯瓶制成泡泡料，经熔融纺丝、多元在线添加技术实现再生纤维的在线着色。

主要规格：

1.67dtex ~ 130dtex

产品标准：

《再生涤纶短纤维》（FZ/T 52010-2014 ）
《再生有色涤纶短纤维》（FZ/T 52025-2012）

## 1.3 特点及用途

(1)防泼水循环再生聚酯纤维：

特殊的纤维截面，增加布身表面积，提高助剂的吸附性和耐洗性。面料具防泼水、高弹力、棉质感特性。可用于沙滩裤、户外服装等。

(2)低熔点循环再生聚酯复合纤维：

具有优良的热粘合性能，用于热粘合无纺布热轧无纺布和汽车内饰床垫建筑吸音、隔热材料等。

(3)多功能循环再生聚酯纤维：

把多种功能性、舒适性、生态亲和与低碳环保有效的结合起来，品种丰富，可实现单组份多功能。可用于服装、家用纺织品和产业用纺织品。

(4)有色循环再生聚酯纤维：

纤维色牢度好，色彩丰富，减少后染色工序，减少废水排放。产品应用于汽车、航空、高铁内饰和高档服装面料。

## 1.4 应用技术

(1)防泼水循环再生聚酯纤维：

可与其他纤维混纺制成 75D 加密平纹弹力布、经防水处理后，具有良好的防泼水功能。

(2)低熔点循环再生聚酯复合纤维：

可与其他纤维混合，具有良好的耐洗性、回弹性及加工性能。

(3)多功能循环再生聚酯纤维：

可纯纺，或与粘胶、竹纤维、棉混纺制成纱线，用于针织和梭织。

(4)有色循环再生聚酯纤维：

纤维单独使用或与其他纤维交织，用于针织和梭织；后整理参照普通涤纶。

## 1.5 关注品种

吸水快干循环再生聚酯纤维、防透视循环再生聚酯纤维、中空有硅循环再生聚酯纤维。



(4) Regenerated polyester color fiber:
All use the polyester nonwoven fabrics, textile wastes, polyester waste blocks, waste polyester films and waste polyester bottles to produce the bubble materials, achieving the on-line coloration of the regenerated fiber by using the melt spinning and multiple on-line addition technologies.

Product specification:

1.67dtex - 130dtex

Product standard:

"Recycled Polyester Staple Fiber" (FZ/T 52010-2014), "Recycled Colored Polyester Staple Fiber" (FZ/T 52025-2012)

## 1.3 Features and applications

(1) Water repellent recycled polyester fiber: it uses the special amorphous fiber section to increase the surface area of the cloth, improve the absorbability and wash-resistance of the auxiliaries. The fabric has the features of high elasticity, water repellency and cotton texture. It can be used for beach pants, outdoor wear and other clothes.

(2) Low-melting-point recycled polyester composite fiber: it has excellent thermal bonding property, used for thermal bonded nonwoven fabrics, calender-bonded nonwoven cloths and car interiors, mattresses, sound-absorbing and heat-insulating materials for buildings.

(3) Multifunctional recycled polyester fiber: the effective combination of many functional, comfortable, eco-friendly, low-carbon and environmentally-friendly properties with rich varieties, can realize the one-component multiple functions. It can be used in clothing, home textiles and industrial textiles.

(4) Regenerated polyester color fiber:
The fiber has a good color fastness and rich colors, and reduces the post-dyeing process and the wastewater discharges. The product is used in interiors for automotive, aviation and high-speed rail, and in fabrics for high-grade clothing.

## 1.4 Application technologies

(1) Water repellent recycled polyester fiber: it can be blended with other fibers into 75D densified plain elastic cloth with a good water repellency after waterproofing treated.

(2) Low melting point polyester composite fiber: it can be mixed with other fibers with a good wash resistance, resilience and processing performance.

(3) Multifunctional recycled polyester fiber: it can be directly spun, or blended with viscose fiber, bamboo fiber and cotton into yarns, used for knitting and weaving.

(4) Regenerated polyester color fiber: it can be used alone or interwoven with other fibers for knitting and weaving; for its post-finishing refer to the ordinary polyester.

## 1.5 Varieties concerned

Water-absorbing and quick-drying recycled polyester fiber, opaque recycled polyester fiber, silicon regenerated polyester hollow fiber.

# 二 . 无染纤维

## 2.1 推荐理由

中国纤维主动承担和解决产业链中的污染，提升整个产业的形象。无染纤维颠覆传统染色工艺，在纺丝成型的同时实现纤维染色，极大的降低了能耗和污染。制品耐洗、耐晒色牢度高、染色均匀，织物色彩丰富、风格独特。无染纤维在减少对水资源二次污染的同时，延长纤维制品的使用寿命，更成为产品设计师创作的灵感与源泉。

## 2.2 制备技术

### (1)无染聚酰胺 6 纤维 :

采用母粒注射法、熔融纺丝法生产原液着色聚酰胺 6 长丝。

主要规格 :

89~222dex/24~102f

产品标准 :

《有色聚酰胺 6 纤维》(QB/440705 59 779-2012)(Q/XJ 14-2012)

### (2)无染聚酯纤维 :

采用母粒注射法、熔融纺丝法生产无染聚酯纤维。

主要规格 :

1.11~-1.33dtex×38mm~51mm

产品标准 :

《有色缝纫线用涤纶短纤维》(FZ/T 52036-2014)

### (3)无染异形聚酯单丝 :

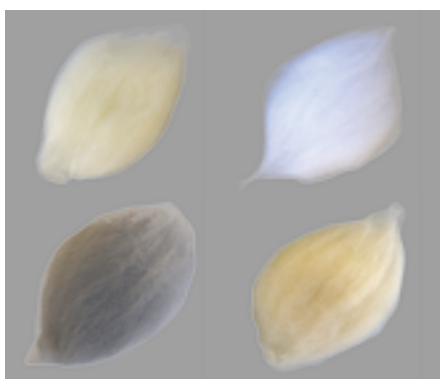
采用纺前着色、截面异形化、共混改性、熔融纺丝技术制备的无染异形聚酯单丝。

主要规格 :

5.55~165dtex

产品标准 :

《有色涤纶牵伸单丝》(FZ/T 54052-2012)





# 2. SPUN-DYED FIBERS

## 2.1 Reasons to recommend

The China Fiber initiatively undertakes and solves the pollution in the industrial chain to enhance the image of the whole industry. The spun-dyed fiber subverted the traditional dyeing process and complete the dyeing during spinning. This greatly reduces the energy consumption and pollution. The products are washable, high color fastness to light and uniform dyeing, the fabrics are rich in color with unique style. The spun-dyed fiber reduces the secondary pollution of water resources while prolonging the service life of fiber products, and moreover becomes the inspiration and source for the product designers.

## 2.2 Preparation technology

**(1) Spun-dyed polyamide 6 fiber:** it uses master-batch injection process and melt spinning method to produce the spun-dyed polyamide 6 filament.

Main specification:

89 - 222dex/24 - 102f;

Product standard:

Colored Polyamide 6 Fiber" (QB/440705 59 779-2012)(Q/XJ 14-2012)

**(2) Spun-dyed polyester fiber:** it uses master-batch injection process and melt-spinning method to produce spun-dyed melt direct-spun polyester fiber.

Main specification:

1.11 - -1.33dtex×38mm - 51mm

Product standard:

"Polyester Staple Fibers for Colored Sewing Threads" (FZ/T 52036-2014)

**(3) Spun-dyed profiled polyester monofilament yarn:** it is prepared by using the producer coloration, cross-section profiling, blending modification, melt spinning technologies.

Main specification:

5.55 - 165dtex

Product standard:

"Colored Polyester Drawn Filament" (FZ/T 54052-2012)

## 2.3 Features and applications

**(1) Spun-dyed polyamide 6 fiber:** it has high color fastness, is green and environmentally-friendly, dyeing uniform and beautiful in color. It is used for seamless underwear, swimsuit, yoga wear and other clothes.

**(2) Spun-dyed melt direct-spun polyester fiber:** it has high color fitness, high-strength and low elongation, high product quality and high stability, and the production process is energy-saving and environmentally friendly. It is used for sewing threads, embroidery threads and warp knitting jacquard threads and other yarns.

## 2.3 特点及用途

(1)无染聚酰胺 6 纤维：

色牢度高、绿色环保、染色均匀，色彩艳丽。应用于无缝内衣、泳衣、瑜伽服等。

(2)无染聚酯纤维：

色牢度高、高强低伸、产品质量高、稳定性好，生产过程节能环保，应用于缝纫线、绣花线及经编大提花系列用纱等。

(3)无染异形聚酯单丝：

色牢度高、绿色环保、纤维强力高，断裂伸长低，沸水收缩率低、尺寸稳定，不易变形，织物回弹性良好。用于窗纱、筛网、网布、水切袋、并线等。

## 2.4 应用技术

(1)无染聚酰胺 6 纤维：

适用于机织、经纬编等。

(2)无染聚酯纤维：

经纤维配棉、配色，满足缝纫线、绣花线的色彩、强力、可纺性及化学品的相关要求。

(3)无染异形聚酯单丝：

可直接用于纺纱、织造，也可与其他纤维交织，适用于丝滑织物与室外用品等。

## 2.5 关注品种

无染再生纤维素纤维、无染循环再生纤维、无染多孔扁平聚酯纤维。



(3) Spun-dyed profiled polyester monofilament: it has high color fitness, green and environmentally-friendly features, high fiber strength, low breaking elongation, low boiled water shrinkage and dimensional stability, and it is not easy to deform and its fabric has a good resilience. It is used for window screens, screen meshes, mesh cloths, water cut bag, and paralleled yarns.

## 2.4 Application technologies

(1) Spun-dyed polyamide 6 fiber: it is applicable for weaving, warp and weft knitting and other operations.

(2) Spun-dyed polyester fiber: it mixes with cotton and uses color matching to meet the relevant requirements for color, strength and spinning property of sewing threads and embroidery threads as well as chemicals.

(3) Spun-dyed profiled polyester monofilament: it can be directly used for spinning and weaving without dyeing; it can be interwoven with other fibers for silk fabrics, outdoor products and other products.

## 2.5 Varieties concerned

Spun-dyed regenerated cellulose fiber, spun-dyed recycled fiber, spun-dyed porous flat polyester fiber.

# 三 . 生物基化学纤维

### 3.1 推荐理由

大自然是一个神秘而又富饶的“生命体”，它的反馈总是伴有惊喜，人类的一举一动都与其息息相关，资源发展压力增大迫使人类寻找新的突破。来源于自然的生物基材料，是未来资源发展的绿色通道，超越天然是材料科技的永续追求。生物基绿色纤维与人体亲和，具有抑菌、阻燃、生物降解等特性，充分体现了可再生资源的综合利用与现代纤维加工技术完美融合。

### 3.2 制备技术

**(1)速效抑菌止血壳聚糖纤维：**

以壳聚糖为原料，采用活化工艺、湿法纺丝技术制备。

主要规格：

1.6dtex×60mm

产品标准：

《壳聚糖短纤维》
（FZT52012-2011）
《壳聚糖混纺针织面料》
（FZT72011-2011）
《抗菌针织品》
（FZT73023-2006）
《壳聚糖纤维与棉混纺本色纱线》
（FZ/T 2085-2010）

**(2)莱赛尔纤维：**

以 NMMO 为溶剂，将纤维素直接溶解，经干湿法纺丝制得纤维素纤维。

主要规格：

1.33dtex×38mm, 1.56dtex×38mm

产品标准：

《Lyocell 短纤维》
（Q/BTE001-2015）

### 3.3 特点及用途

**(1)速效抑菌止血壳聚糖纤维：**

具有高吸水速率、天然抑菌、消炎止痛、快速止血、促愈再生功能。终端产品主要用于紧急医疗、军阵医疗、消防救援、野外救援、运动伤害等领域。



# 3. BIO-BASED CHEMICAL FIBER

### 3.1 Reasons to recommend

Nature is a mysterious and rich "life body", its feedback is always accompanied by a surprise, each and every human action is related to it and the increase in development pressure of the resources forces the human to seek a new breakthrough. The bio-based materials sourced from the nature are the green channels for development of future resources, and overpassing the nature is the age-long pursuit of the material science and technology. The bio-based green fiber is amiable to the human with bacteriostatic, flame retardant, biological degradation and other characteristics, fully embodying the perfect fusion of the comprehensive utilization of renewable resources with the processing technologies of modern fibers.

### 3.2 Preparation technology

**(1) Quick antibacterial and hemostatic chitosan fiber:** it is prepared by using the activation process and wet spinning technology with chitosan as raw material.

Main specification:

1.6dtex×60mm

Product standard:

"Chitosan Staple Fiber" (FZT52012-2011); "Chitosan Blended Knitted Fabrics" (FZT72011-2011); "Antibacterial Knitwear" (FZT73023-2006); "Grey Yarns Blended with Chitosan Fiber and Cotton"; (FZ/T 2085-2010).

**(2) Lyocell fiber:** Use NMMO as the solvent to dissolve directly the cellulose and produce the cellulose fibers by dry-jet-wet spinning.

Main specification:

1.33dtex×38mm, 1.56dtex×38mm

Product standard:

"Lyocell Staple Fibers" (Q/BTE001-2015)

### 3.3 Features and applications

**(1) Quick antibacterial and hemostatic chitosan fiber:** it has high water absorption and naturally antibacterial, anti-inflammatory and analgesic, quick hemostatic, healing and regenerative functions. The end products are mainly used for emergency medical service, army medical service, firefighting and rescue, field rescue, sports injuries medical services and other fields.

(2)莱赛尔纤维：

纤维干、湿强度高，勾结强度好，湿模量高，织物宜洗，色牢度较好。除了用于牛仔裤、时装、休闲装、内衣，还广泛用于医药卫生业、清洁行业、烟草业、包装材料等。

## 3.4 应用技术

(1)速效抑菌止血壳聚糖纤维：

可与天丝、再生纤维素纤维等混纺制成水刺非织造布，壳聚糖生物基化学纤维含量在 20% 以上。

(2)莱赛尔纤维：

能纯纺，也可以与棉、毛、其他合成纤维等混纺，可机织和针织。利用其原纤化特性，可使织物呈现桃皮绒效果。

## 3.5 关注品种

生物基 PBT 纤维、生物基 PTT 纤维、超细莫代尔纤维。



(2) Lyocell fiber: the fiber has high dry-wet strength, high wet modulus, and the fabric is suitable for washing without ironing and has dimensional stability and good color fastness. It is used for jeans, fashionable dress, casual wear and underwear. It is also widely used in medical and health industry, cleaning industry, tobacco industry, packaging materials and other industries.

### 3.4 Application technologies

(1) Quick antibacterial and hemostatic chitosan fiber: it can be blended with Tencel, regenerated cellulose fiber and other yarns into spunlaced nonwoven fabrics, and the content of chitosan bio-based chemical fiber is more than 20%.

(2) Lyocell fiber: it can be directly spun, or blended with cotton, wool and other synthetic fibers, and can be woven and knitted. The application of its original fiber characteristics can make the fabric show peach skin-like effect.

### 3.5 Varieties concerned

Bio-based PBT fiber, bio-based PTT fiber, ultrafine modal fiber.

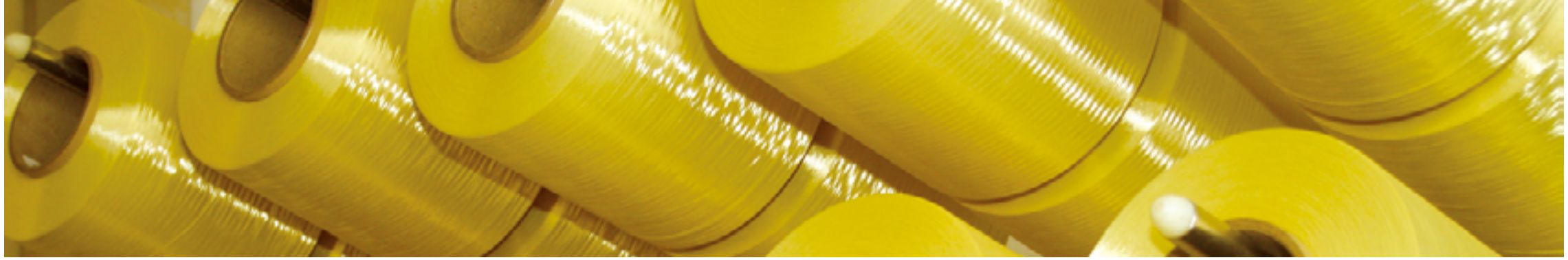
# 纤·智汇

## 颠覆与重塑

SUBVERSION & REMODELING

2015 年中国纤维产量达到 4800 万吨，承担了世界 55% 的穿衣、装饰等重任。中国纤维制造技术快速发展，细旦、异形、改性等技术日新月异，无论在 300℃以上高温，强酸强碱高腐蚀环境下，还是在高抗冲、高形变等场合，中国纤维汇聚智慧，重塑产品内涵，给生命带来保障、给自然带来保护、给建筑带来安全。

The fiber yield of China reached 48 million tons, and assumed 55% of the world's clothing, decoration and other heavy responsibilities in 2015. The fiber manufacturing technology of China rapidly developed, and the fine-denier, profiling, modification and other technologies brought about new changes, wherever in the high temperature over 300 ºC, and in the strong acid and alkali corrosion environment or in high impact, high deformation and other conditions, the China fiber has brought the wisdom together, reshaped the product connotation, bringing the assurance to the life, the protection to the nature and the safety to the buildings.



# 一．安全防护纤维

## 1.1 推荐理由

恐怖袭击事件、火灾爆炸、职业伤害等事件频发，严重影响了社会和谐与发展，防爆服装、特种职业服装、安保设施等配置亟待升级。高强高模、隔热阻燃等安全防护纤维在柔性个体、装备防护等领域发挥着举足轻重的作用。

## 1.2 制备技术

**(1)超高分子量聚乙烯纤维：**

采用干法纺丝工艺（自主研发溶剂精馏系统，溶剂回收率达 98% 以上）制得。

主要规格：

200dtex/198f、400 dtex /230f、1.21dtex×38 mm、1.21 dtex×51 mm、1.91 dtex×38mm、1.91dtex×38mm

产品标准：

《超高分子量聚乙烯长丝》（Q/SH 3070 02.31-2011）

**(2)高强型对位芳纶纤维：**

以对苯二胺与对苯二甲酰氯为原料，采用干喷湿纺工艺制成。

主要规格：

924~1650dtex

产品标准：

《对位芳纶（1414）长丝》（FZ/T 54076-2014）

**(3)阻燃隔热玄武岩纤维：**

玄武岩石料在 1450℃—1500℃熔融后，通过铂铑合金拉丝漏板高速拉制而成的连续纤维。

主要规格：

直径 8 微米

产品标准：

《玄武岩纤维无捻粗纱》（GB/T25045-2010）



# 1. SAFETY PROTECTIVE FIBERS

## 1.1 Reasons to recommend

The terrorist attack, fire and explosion, occupational injury and other accidents occur frequently that seriously impacts on the social harmony and development, and the explosion-proof clothes, special professional clothing, security facilities and other configurations need to be upgraded urgently. The high-strength and high-modulus, thermal insulation, flame retardant and other safety and protective fibers play a predominant role in the flexible individual, equipment protection and other fields.

## 1.2 Preparation technology

**(1) Ultrahigh molecular weight polyethylene fiber:** it is made by using the dry spinning process (independent research and development of solvent distillation system with solvent recovery rate of 98% and above).

Main specification:

200dtex/198f, 400 dtex / 230f, 1.21 dtex×38 mm, 1.21 dtex×51 mm, 1.91 dtex×38mm, 1.91dtex×38mm

Product standard:

"Ultrahigh Molecular Weight Polyethylene Filament" (Q/SH 3070 02.31-2011)

**(2) High-strength para-aramid fiber:** it is made of p-phenylenediamine and paraphthaloyl as raw materials by using dry-jet-wet spinning process.

Main specification:

924 - 1650dtex

Product standard:

"Para-Aramid (1414) Filament" (FZ/T 54076-2014)

**(3) Flame retardant insulating basalt fiber:** the continuous fiber made of basalt stone materials melt in 1450°C to 1500°C by high-speed drawing through platinum-rhodium-alloy bushing-plate.

Main specification:

8 μm diameter

Product standard:

"Basalt Fiber Direct Roving" (GB/T25045-2010)

(4)有色聚酰亚胺纤维：

以国产均苯四甲酸二酐和 4,4’-二胺基二苯醚为单体，二甲基乙酰胺为溶剂，并加入着色剂，通过低温缩聚，合成聚酰胺酸溶液，采用干法纺丝工艺技术制备前驱体无染纤维，再通过环化—拉伸一体化等后处理，得到有色聚酰亚胺纤维。

主要规格：

1.67dtex-5.5dtex/30mm-150mm

产品标准：

《聚酰亚胺短纤维》
(Q320791WAB 02-2014)

(5)锦纶导电纤维制备工艺：

将生产原料、导电母粒及各种辅料按比例均匀混合，经熔融纺丝制得。

主要规格：

22.2dtex/2f、20dtex/3f、20dtex/4f

产品标准：

《锦纶导电牵伸丝》
（ZJA/N 1006-2015）

(3)阻燃隔热玄武岩纤维：

具有永久的阻燃性，可用于消防避火服中的阻燃隔热面料、高速列车桌椅面料、宾馆窗帘、沙发面料等。

(4)有色聚酰亚胺纤维：

采用原液染色制备彩色聚酰亚胺纤维（黑色，桔红色，藏青色，墨绿），具有耐摩擦、高强，高模，耐热，耐老化、阻燃、保暖、高低温稳定，电绝缘、抗熔滴等特性。亲肤无害,抑菌健康,可用于防护服,户外服装、运动服、家纺、内衣等。

(5)导电聚酰胺 6 单丝：

在标准状态下 (200C, 65% RH) 电阻率小于 107Q·cm。具有良好的耐摩擦、耐氧化及耐腐蚀能力，可加工性好，与普通纤维混纺或交织时不影响织物的手感和外观。可用于普通的防静电工作服、防尘服、洁净服、高档服装里布，还可用于电磁波屏蔽，军工纺织品。

## 1.3 特点及用途

(1)超高分子量聚乙烯纤维：

具有高强度、高模量、防切割、接触凉感、耐酸碱、耐紫外线、耐有机溶剂等特性。长丝系列：用于凉感家纺面料、工装和运动面料；短丝系列：用于生产工装及其它面料、防割防刺或增强基布的无纺制品。

(2)高强型对位芳纶纤维：

具有质轻、高强、高模、耐腐蚀、耐高温、阻燃、弹性收缩率低等特性，广泛应用于建筑、高强度缆绳、防割手套、防弹衣、防弹头盔等防护领域。与树脂、橡胶等材料复合，可大幅度减轻构件重量，适用于制作航空航天器材、高速列车和游艇外壳等。



(4) Polyimide color fiber: it uses the domestic pyromellitic dianhydride and 4,4'-diaminodiphenyl ether as monomers, and dimethyl acetamide as solvent to synthesize the polyamide acid solution by adding colorant through low temperature poly-condensation, and uses dry spinning process technology to prepare the precursor spun-dyed fiber, and then obtain the polyimide color fiber through cyclizing-drawing integrated process.

Main specification:

1.67dtex-5.5dtex/30mm-150mm

Product standard:

"Polyimide Staple Fiber" (Q320791WAB 02-2014)

(5) Conductive polyamide 6 monofilament: it is made through melt spinning by uniformly and proportionally mixing raw materials, conductive master-batch and various auxiliary materials.

Product specification:

22.2dtex/2f, 20dtex/3f, 20dtex/4f

Product standard:

"Nylon Conductive Drawn Yarn" (ZJA/N 1006-2015)

### 1.3 Features and applications

(1) Ultrahigh molecular weight polyethylene fiber: it has high strength, high modulus, cutting prevention, contact cool feeling, resistance to acid and alkali, and resistance to UV and organic solvent. Filament series: used for cool feeling home textile fabric, tooling and sportswear fabric; staple fiber series: used for production of nonwoven products for tooling and other fabrics, and cutting and stabbing preventive or reinforced base fabrics.

(2) High strength para-aramid fiber: it has light weight, high strength, high modulus, corrosion resistance, high temperature resistance, flame retardancy, low elastic shrinkage and other characteristics, and is widely used in building, high-strength cables and ropes, cutting resistant gloves, bulletproof vests and helmets and other protective fields. Via compositing with resin, rubber and other materials, it can greatly reduce the weight of the construction components, and is applicable to the production of shells, hulls and other parts of aerospace equipment and devices, high-speed trains and boats.

(3) Flame retardant insulating basalt fiber: it has permanent flame retardancy and is applicable to the flame-retardant and thermal insulation fabrics in firefighting and entry clothing, fabrics for furniture in high speed train, hotel curtains, sofa fabrics and other fabrics.

(4) Polyimide color fiber: it uses dope-dying technology to prepare the color polyimide fiber (black, orange red, navy blue an dark green), and has high friction resistance, high strength, high modulus, heat resistance, aging resistance, flame retardancy, thermal protection, high and low temperature stability, electrical insulation, molten-dripping prevention and other properties. It is skin friendly and harmless, antibacterial and healthy. It can be used for protective clothing, outdoor clothing, sportswear, home textile, underwear and other clothes.

(5) Conductive polyamide 6 monofilament: it has a resistivity less than 107Q·cm in standard conditions (200oC, 65%RH). It has a good friction resistance, oxidation resistance, corrosion resistance and good workability, the blending or interweaving with the ordinary fibers doesn't affect the touch feeling and appearance of the fabrics. In addition to the use for ordinary antistatic overalls, dust-proof clothing, clean clothes, high-grade cloth linings, it can also be used for electromagnetic wave shields, military textile development.

## 1.4 应用技术

(1)超高分子量聚乙烯纤维：

一般与其它纱线混纺，且超高分子量聚乙烯纤维的含量不低于 20%。可用于机织、针织面料。

(2)高强型对位芳纶纤维：

用于防弹、防割防刺织物：较多的采用机织平纹结构密织，有效提高织物的交接点数量和变形损耗能；

用于防火面料：将对位芳纶与间位芳纶短纤混纺或包芯，对位芳纶保证织物结构的坚实性，间位芳纶形成泡沫防热隔绝层。

(3)阻燃隔热玄武岩纤维：

纬纱用玄武岩纤维、经纱用间位芳纶合编可制成永久性阻燃面料。

(4)有色聚酰亚胺纤维：

有色聚酰亚胺纤维可以单独使用，也可以与阻燃涤纶、阻燃再生纤维素纤维等各种纤维进行混纺，适用于各种类型的机织和针织面料。

(5)导电聚酰胺 6 单丝：

产品可以与各种纤维混纺和交织，适用于各种类型的针织和梭织；可染色，后整理参照普通锦纶。

## 1.5 关注品种

阻燃聚酰胺 66 纤维、阻燃负离子聚酯纤维、阻燃抗紫外聚酯纤维。



## 1.4 Application technologies

(1) Ultrahigh molecular weight polyethylene fiber: it is generally blended with other yarns, and the content of ultrahigh molecular weight polyethylene fiber is not less than 20%. It can be used for woven and knitted fabrics, and the finished staple fiber is used for cotton and wool spun and nonwoven products.

(2) High strength para-aramid fiber:

for bullet protective and cutting / stabbing preventive fabrics: most of them use the woven plain structure for tight-weaving, to effectively improve the number of connection points and energy consumption of deformation loss of the fabrics;

for fireproof fabric: blend or core-spin the para-aramid and meta-aramid staple fibers to ensure the para-aramid fibers have a solidity of their texture structure and the meta-aramid fibers form a foam thermal insulation layer.

(3) Flame retardant insulating basalt fiber: the weft uses basalt fibers though the warp with the meta-aramid fibers to knit into a permanent flame retardant fabric.

(4) Polyimide color fiber: it can be used alone, or blended with different fibers of flame retardant polyester, flame retardant regenerated fiber cellulose and other fibers, applicable to various types of woven and knitted fabrics.

(5) Conductive polyamide 6 filament: the product can be blended and interwoven with all different fibers, and is suitable for all kinds of knitting and weaving; it can be dyed, for finishing refer to the common nylon.

## 1.5 Varieties concerned

Flame retardant polyamide 66 fiber, flame retardant negative ion polyester fiber, spun-dyed flame-retardant and UV resistant polyester fiber.

# 二 . 高温过滤纤维

## 2.1 推荐理由

石油、冶金、电力、钢铁和建材是我们赖以生存与发展的基础，但伴随着工业粉尘温度高、含尘量大、成分复杂、颗粒分布宽、大气污染严重，京津冀等地区 PM2.5 屡屡爆表，高效拦截颗粒物、享受蓝天白云，中国纤维责无旁贷。高温过滤纤维突破耐温极限，强化集聚效应，从污染源头对有害细颗粒物进行高效吸附与拦截，消除有害物质排放，有效维护自然环境，保障健康生活空间。

## 2.2 制备技术

(1)纳米改性聚苯硫醚纤维：

经纳米改性两步法短纤维生产工艺制成。

主要规格：

1.1~2.2dtex×51~65mm

产品标准：

《聚苯硫醚短纤维》
(FZ/T 52017-2011)
《改性聚苯硫醚短纤维》
(Q/AHH)

(2)细旦聚酰亚胺纤维：

通过湿法纺丝工艺制成。

主要规格：

0.89~ 2.22dtex×38~64mm

产品标准：

《聚酰亚胺短纤维》(QCGQ/02-2201)



# 2. HIGH TEMPERATURE FILTRATION FIBERS

## 2.1 Reasons to recommend

The petroleum, metallurgy, electric power, iron and steel, and building materials are our survival and development basis, accompanied with high temperature of industrial dusts, high dust content, complex composition and wide particle distribution, causing a serious air pollution. The PM2.5 in Beijing-Tianjin-Hebei region often triggers alarms, so the China fiber is obliged to efficiently intercept the particles and enjoy the blue sky and white clouds. The high temperature filter fiber breaks through the limit of temperature resistance and strengthens the agglomeration effect to efficiently absorb and intercept the harmful fine particles from the pollution source, eliminate the emissions of harmful substances, effectively protect the natural environment, protecting the healthy living space.

## 2.2 Preparation technology

(1) Nano modified polystyrene sulfide fiber: it is made by using the Nano-modified two-step staple fiber production process.

Main specification:

1.1 - 2.2dtex×51 - 65mm

Product standard:

"Polyphenylene Sulfide Staple Fibers" (FZ/T 52017-2011); "Modified Polyphenylene Sulfide Staple Fibers" (Q/AHH)

(2) Fine denier polyimide fiber: it is made by using wet spinning process.

Main specification:

0.89 - 2.22dtex×38 - 64mm

Product standard:

"Polyimide Staple Fibers" (QCGQ/02-2201)

## 2.3 Features and applications

(1) Nano modified polyphenylene sulfide fiber: compared to the ordinary PPS fiber, the oxidation induction temperature increased by more than 7-10°C and the decomposition temperature increased 40°C, it is resistant to high temperature and acid corrosion, it has a good dimensional stability and strong toughness. It is mainly used in dust filtration bags for coal-fired power plants and municipal waste incineration plants.

(2) Fine denier polyimide fiber: fine denier polyimide fiber has a large specific surface area that enhances the filtration efficiency, and is resistant to high temperature and chemical corrosion, it is widely used in high-temperature bag-type dust removing devices for cement plants, coal-fired power plants, steel plants, waste incineration plants, smelting plants, chemical plants and other plants.

## 2.3 特点及用途

(1)纳米改性聚苯硫醚纤维：

与普通 PPS 纤维相比，氧化诱导温度提高 7-10℃以上，分解温度增加 40℃，耐高温、耐强酸腐蚀、尺寸稳定性好、韧性强。主要用于燃煤电厂和城市垃圾焚烧除尘滤袋。

(2)细旦聚酰亚胺纤维：

细旦聚酰亚胺纤维比表面积大，提高过滤效率，且耐高温、耐化学腐蚀，广泛应用于水泥厂、燃煤电厂、钢铁厂、垃圾焚化厂、冶炼厂、化工厂等高温袋式除尘。

## 2.4 应用技术

(1)纳米改性聚苯硫醚纤维：

产品可以单独使用或与 PPS、PTFE 等耐高温、耐腐蚀、耐酸碱的高性能纤维混合使用，适用于多种类型的针刺无纺布；后整理工艺参照普通 PPS 纤维。

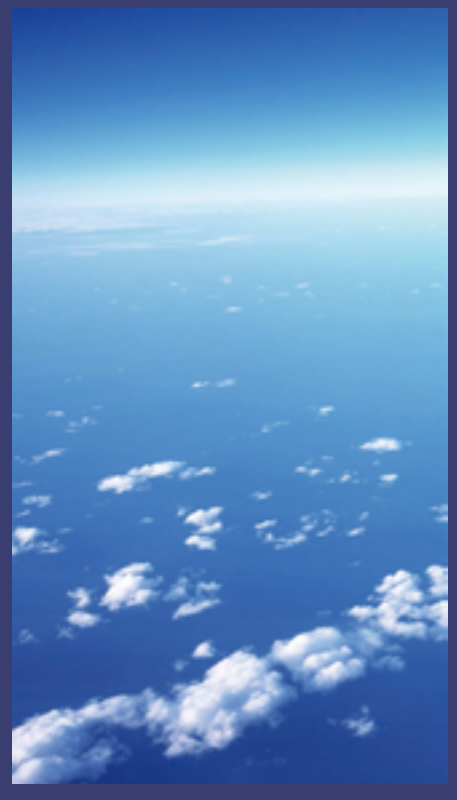
(2)细旦聚酰亚胺纤维：

做高温过滤用时，必须单独使用，否则降低过滤效果。

## 2.5 关注品种

聚四氟乙烯纤维、间位芳纶。





## 2.4 Application technologies

(1) Nano-modified polyphenylene sulfide fiber: the products can be used alone or together with PPS, PTFE and other high performance fibers with high temperature resistance, corrosion resistance, and acid and alkali resistance, and used for various needle-punched nonwoven fabrics; for the post finishing process refer to the ordinary PPS fibers.

(2) Fine denier polyimide fiber: the fine denier polyimide staple fiber has good high-temperature stability, chemical corrosion resistance and excellent resistance to high and low temperature, flame retardancy, free of molten dripping, fire self-extinguishing away from fire and other characteristics, and the filter materials made of polyimide fiber can be used for high-temperature smock dust filtration in steel, cement and other plants.

## 2.5 Varieties concerned

PTFE fiber, para-aramid fiber, meta-aramid fiber, poly-sulfonamide.

# 三．增强工程纤维

### 3.1 推荐理由

近年来，“路脆脆”、“桥歪歪”、“楼倒倒”等事件时有发生，人们越来越重视建筑工程质量安全问题。纤维水泥混凝土可极大提高防裂抗渗能力，增加建筑抗形变、抗冲击能力，大大提升了建筑物质量，降低维护成本，延长使用寿命。增强工程纤维，开启了纤维应用的新篇章。

### 3.2 制备技术

**亲水增强聚酯工程纤维：**

经熔体直接纺丝、拉伸定型后根据要求切断成超短纤。

主要规格：

1.14~1.67dtex×6~12mm

产品标准：

《涤纶超短纤维》（FZT 52015-2011）

### 3.3 特点及用途

**亲水增强聚酯工程纤维：**

亲水性好，断裂强度高，断裂伸长率低，尺寸稳定性好。主要应用于特种纸张、无纺布、混凝土等增强材料。

### 3.4 应用技术

亲水增强聚酯工程纤维：可根据应用领域要求切断成不同规格的短纤，然后进行涂布等。

### 3.5 关注品种

超短聚丙烯腈工程纤维、超短聚乙烯醇工程纤维、超短聚丙烯工程纤维。



# 3. REINFORCED ENGINEERING FIBERS

### 3.1 Reasons to recommend

In recent years, the "Collapse of Road", "Collapse of Bridge" and "Collapse of Building" and other accidents have been often happened, so people pay more and more attentions to the quality and safety problems of building projects. The fiber-cement concrete can greatly improve the anti-cracking impermeability, strengthen the deformation and impact resistance of the buildings that greatly enhances the building quality, reduces the maintenance cost and prolongs the service life. The reinforced engineering fiber has opened a new chapter in the applications of fibers.

### 3.2 Preparation technology

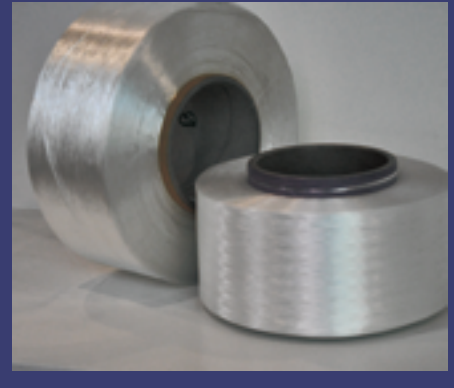
(1) Hydrophilic reinforced polyester engineering fiber: it is cut into ultra-short staple fibers according to the requirement after the melt is directly spun, drawn and shaped.

Main specification:

1.14 - 1.67dtex×6 - 12mm

Product standard:

"Polyester Ultra-Short Staple Fibers" (FZT 52015-2011)



### 3.3 Features and applications

The hydrophilic reinforced polyester engineering fiber: it has good hydrophilicity, high breaking strength, low breaking elongation and good dimensional stability. It is mainly used in special paper, nonwoven fabric, concrete and other reinforced materials.

### 3.4 Application technologies

The hydrophilic reinforced polyester engineering fiber: it can be cut into staple fibers of different sizes according to the requirements of different fields, and then coated and treated by other processes.

### 3.5 Varieties concerned

Ultra-short staple fiber, ultra-short PVA engineering fiber, ultra-short PP engineering fiber.

# 纤·雅幻

## 颠覆与重塑

SUBVERSION & REMODELING

审美是一种体验，是一种精神享受、一种超功利的精神愉悦。从古至今，色彩与形态在服饰审美中都有着举足轻重的作用。中国纤维科技与时尚灵动交互，将纤维的绚丽色彩、轻柔飘逸、纹理质感等多面性淋漓尽致的展现，重塑纤维独特的时尚理念，给消费者带来全新的审美体验。

The aesthetics is an experience, a spiritual enjoyment and a super-utilitarian spiritual joy. From ancient times to the present, the color and formation plays a significant role in the dress aesthetics. The interaction of China fiber technology with smart fashion incisively and vividly demonstrates the brilliant colors, softness and elegancy, texture and other versatilities of the fiber, remodeling the unique fashion conception of the fiber, and bringing a new aesthetic experience to the consumers.

# 一 . 幻彩纤维

## 1.1 推荐理由

色彩是人们对世界最直接的体验，表达着人们的信念、期望和对未来生活的预测。挑战色彩极限，赋予色彩动感，拓宽织物的染色范围及色域，充分展示服饰之美，提升个人形象与魅力，实现内在与外在的和谐。幻彩纤维在常温常压下大幅提升染色性能，色彩绚丽，手感柔软；能随环境的变化显示不同颜色，多姿多彩，美轮美奂。

## 1.2 制备技术

**(1)阳离子低温可染聚酯纤维：**

采用共聚改性经熔融纺丝制备。

主要规格：

55.5~165dtex/24~72f

产品标准：

《阳离子染料可染改性涤纶低弹丝》（FZ/T54067-2013）

**(2)深染改性聚酰胺 6 纤维：**

通过共聚改性制备深染聚酰胺 6 纤维。

主要规格：

22.2 ~110dtex/24-68f

产品标准：

《深染锦纶 6 牵伸丝》（2015-15T-HX）



# 1. COLORFUL FIBERS

## 1.1 Reasons to recommend

The color is the most direct experience of the people to the world to express the people's beliefs, expectations and predictions for the future life. To challenge the color limit, give the color dynamics and broaden the dyeing range and color gamut of the fabrics, fully demonstrates the beauty of clothing and enhances the personal image and charm, achieving the internal and external harmony. The colorful fiber can increase significantly the dyeing performance with a brilliant color and soft touch feeling under normal temperature and pressure; it can appear different colors with colorful, splendid and fantastic colors in different environments.

## 1.2 Preparation technology

**(1) Cationic low temperature dyeable polyester fiber:** it is made by using copolymerizing modification through melt spinning.

Main specification:

55.5 - 165dtex/24 - 72f

Product standard:

"Cationic-Dye Dyeable Modified Polyester Drawn Textured Yarns" (FZ/T54067-2013)

**(2) Deeply dyed and modified polyamide 6 fiber:** prepare the deeply dyed polyamide 6 fiber by copolymerization modification.

Main specification:

22.2 - 110dtexD/24-68f

Product standard:

"Deeply Dyed polyamide Fiber 6 Drawn Yarns" (2015-15T-HX)

**(3) Regenerated cellulose fiber for jeans:** produce regenerated cellulose fibers for jeans by using proprietary dying technology for raw cellulose fiber with high-strength low-elongation.

Main specification:

1.22dtex×32 - 38mm (in different darker and lighter indigo blue colors)

Product standard:

"High-Strength Low-Elongation Viscose Staple Fibers" (GB/T14463-93)

(3)牛仔用再生纤维素纤维：

以高强低伸纤维素纤维为原料，采用专有染色技术，制备色牢度超高的牛仔用再生纤维素纤维。

主要规格：

1.22dtex×32~38mm
（靛蓝各深浅色）

产品标准：

《高强低伸粘胶短纤》
（GB/T14463-93）

(4)光致变色再生纤维素纤维：

采用专用的光致变色剂，与粘胶共混纺丝制得光致变色再生纤维素纤维。

主要规格：

110~330dtex/38~60f

产品标准：

参照标准《粘胶长丝》
(GB/T 13758-2008)

## 1.3 特点及用途

(1)阳离子低温可染聚酯纤维：

100℃染色，不仅有良好的染色性能，还可与羊毛等天然纤维同浴染色，用于服装、家纺等领域。

(2)深染改性聚酰胺 6 纤维：

深染改性纤维比普通产品上色深，能使布面产生染色的层次感，具有独特的色彩风格，手感柔软、绵密。用于户外运动、休闲服饰、裤料裙料等领域。

(3)牛仔用再生纤维素纤维：

具有超高的色牢度与舒适亲肤的触感，减少后道加工工序与废水排放，节约生产成本。用于牛仔领域。

(4)光致变色再生纤维素纤维：

纤维在不同光线下可以变换色彩。用于衬衣、T 恤中的花格面料，防伪 logo、窗帘、军用户外特种防护隐身材料等领域。

## 1.4 特点及用途

(1)阳离子低温可染聚酯纤维：

产品可以单独使用或者与各种纤维交织，适用于各种类型的针织和梭织。

(2)深染改性聚酰胺 6 纤维：

主要用于针织、大园机、经编、花边等。后整理参照普通聚酰胺 6 纤维。

(3)牛仔用再生纤维素纤维：

可广泛用于赛络纺、涡流纺、气流纺、环锭纺等不同纺纱领域，在涡流纺、赛络纺的 50S 以上高支纱领域更有优势。

(4)光致变色再生纤维素纤维：

产品可以单独使用或者与各种纤维交织，适用于各种类型的针织和梭织；产品可以直接用于面料，不易进行二次染色；后整理参照普通再生纤维素纤维；洗涤时适宜使用中性或者碱性的洗涤用品。

## 1.5 关注品种

彩虹纱聚酯纤维、阳离子改性聚酰胺 6 纤维、双抗易染聚酯纤维。



(4) Photochromic regenerated cellulose fiber: it uses special photochromic agent to blend with viscose into photochromic regenerated cellulose fibers.

Main specification:

110 - 330dtex/38 - 60f

Product standard:

refer to the standard "Viscose Filament Yarns" (GB/T 13758-2008)

## 1.3 Features and applications

(1) Cationic low-temperature dyeable polyester fiber: it is dyed in 100°C, and not only has a good dyeing performance, but also can be dyed with wool and other natural fibers in the same bath, and is used for clothing, hone textile and in other fields.

(2) Deeply dyed and modified polyamide 6 fiber: the deeply dyed and modified fiber is dyed darker than ordinary products, and make the cloth create a visual dying sense of layering with a unique style of color, feeling soft and silky. It is used for outdoor sports and leisure clothing, trousering, skirting and other fields.

(3) Regenerated cellulose fiber for jeans: it has ultrahigh color fastness and comfortable skin touch, and has processing process and waste water discharge reduced, and production costs saved. It is used in the jeans field.

(4) Photochromic regenerated cellulose fiber: the fiber can change color in different lights. It is used in plaid fabrics for shirts and T-shirt, anti-counterfeiting logo, curtains, military outdoor special protective stealth materials and other fields.

## 1.4 Application technologies

(1) Cationic low-temperature dyeable polyester fiber: the product can be used alone or interwoven with various fibers, suitable for various knitting and weaving.

(2) Deeply dyed and modified polyamide 6 fiber: it is mainly used for knitting, circular knitting machine, warp knitting, lace and other processes. The finishing process is similar to that of the ordinary polyamide 6 fiber.

(3) Regenerated cellulose fiber for jeans: it can be widely used in siro spinning, vortex spinning, airstream spinning, ring spinning and other different spinning fields, especially it has more advantages in the fields of high-count yarn of above 50S for vortex spinning and siro spinning.

(4) Photochromic regenerated cellulose fiber: the product can be used alone or interwoven with other different fibers, applicable to all kinds of knitting and weaving; the product can be directly used in fabric, but is not easy to carry out secondary dyeing; for post-finishing refer to the ordinary regenerated cellulose fiber; it is better to wash the product with neutral or alkaline detergent.

## 1.5 Varieties concerned

Rainbow yarn polyester fiber, cationic modified polyamide 6 fiber, antistatic and anti-pilling dying polyester fiber.

# 二 . 舒感纤维

## 2.1 推荐理由

酷暑寒冬、刮风下雨，静卧与运动，为保证人体处于最舒适，最自然的状态，缓解疲劳和损耗，服装与人体间微环境的热量、温度、湿度、压力需随时保持动态平衡，功能与智能一体化，衣随人动，人随心动。 舒感纤维根据人体和环境的状态调控温度、水分、湿度及弹性，全方位满足人体亲和、舒适健康、优雅自如的要求。

## 2.2 制备技术

**(1)超细旦可染聚丙烯纤维 :**

通过制备有机－无机可染改性添加剂，匹配添加剂与基体粘度，制备高熔指、窄分布的可染超细旦聚丙烯树脂，再利用熔融纺丝工艺制备。

主要规格 :

27.5~55.5dtex/92f

产品标准 :

《丙纶牵伸丝》（FZ/T 54008–1999）

**(2)超柔超强再生纤维素纤维 :**

采用桉树木浆，生产过程中加入助剂，经湿法纺丝制备而成。

主要规格 :

1.11dtex×38mm

产品标准 :

《粘胶短纤维》
（GB/T 14463-2008）



# 2. COMFORT FIBER

## 2.1 Reasons to recommend

In order to ensure the human body in the most comfortable and the most natural state to alleviate the fatigue and reduce the losses in the cold winter and hot summer, in wind and rain when lying still and moving, the heat, temperature, humidity and pressure in the micro environment between clothing and human body needs to keep the dynamic balance, function and intelligence integration, clothing moves with the human body, people moves with the heart at any time. The comfort fiber controls and adjusts the temperature, moisture, humidity and elasticity according to the state of the human body and environment, meeting all round the requirements of affinity to human body, comfort and health, and natural elegancy.

## 2.2 Preparation technology

**(1) Ultrafine dyeable polypropylene fiber:** prepare the high-melting-point, narrow-distribution dyeable ultrafine denier polypropylene resin by preparation of organic-inorganic dyeable modified additives to match the additives and basic viscosity, and then use the melt spinning process for preparation.

Main specification:

27.5 - 55.5dtex/92f

Product standard:

"Polypropylene Fiber Drawn Yarns" (FZ/T 54008-1999)

**(2) Ultrasoft super-strength regenerated cellulose fiber:** it is made through wet spinning process by using the eucalyptus wood pulp and by adding the additives in the production process.

Main specification:

1.11dtex×38mm

Product standard:

"Viscose Staple Fibers" (GB/T 14463-2008)

(3)永久高弹性聚酯纤维：

采用不同粘度聚酯经复合纺丝技术制备。

主要规格：

55.5~222dtex/12-48f

产品标准：

《涤 / 涤复合丝》
（Q/320584 NPA007-2013）

(4)高收缩涤锦复合纤维：

采用涤锦复合纺丝技术制备。

主要规格：

50~75dtex/24f

产品标准：

《涤锦复合分离型超细低弹丝》
（Q/320601KHT01-2014）

(5)仿绒轻柔聚酯纤维：

采用截面呈特殊的“一字型”喷丝板经熔体直纺工艺加工而成。

主要规格：

230dtex/192f

产品标准：

《涤纶预取向丝》
（FZ/T54003-2012）

(6)亲肤抑菌聚乳酸纤维：

聚乳酸切片为原料，采用熔融纺丝制得。

主要规格：

长丝：33.3~333dtex/36-72f；
短纤：1.11~7.77dtex/38mm

产品标准：

参照标准《涤纶牵伸丝》
（GB/T 8960-2008）、
《涤纶短纤维》
（GB/T 14464-1993 ）

(3) Permanent high-elastic polyester fiber: it is made of polyesters with different viscosity by using composite spinning technology.

Main specification:

55.5 - 222dtex/12-48f

Product standard:

"Polyester/Polyester Composite Yarns" (Q/320584 NPA007-2013)

(4) High-shrinkage polyester-nylon composite fiber: it is made of polyester and nylon by using composite spinning technology.

Main specification:

50 - 75dtex/24f

Product standard:

"Polyester/Nylon Composite Separation Ultrafine Drawn Textured Yarns" (Q/320601KHT01-2014)

(5) Imitation cashmere soft polyester fiber: it is made using melt directly spinning process which adopts spinnerets with a "bar" shape cross-section.

Main specification:

230dtex/192f

Product standard:

"Polyester Partially Oriented Yarn" (FZ/T54003-2012)

(6) Skin-friendly anti-bateria poly-lactic acid fiber: it is made by using the melt spinning with poly-lactic acid chips as raw materials.

Main specification:

filament yarn: 33.3 - 333dtex/36-72f; staple fiber: 1.11-7.77dtex/38mm

Product standard:

refer to the standards "Polyester Drawn Yarn" (GB/T 8960-2008), "Polyester Staple Fiber" (GB/T 14464-1993)

### 2.3 Features and applications

(1) Ultrafine denier dyeable polypropylene fiber: it has a lightweight, warm, antibacterial, waterproof properties and good wicking effect, significant perspiration and silk like luster. It is used for high-grade underwear and professional sports wear.

(2) Ultra-soft super regenerated cellulose fiber: it has soft, beautiful color, antibacterial, oil removing, high strength and other characteristics, and is used for knitted underwear, bedding, socks, towels, jeans, shirts and other clothes.

(3) Permanent high-elastic polyester fiber: it has a good elasticity, dimensional stability and good dyeing uniformity, high weaving efficiency and simple post-processing, and is used for elastic clothing.

(4) High shrinkage polyester / nylon composite fiber: it has a stronger high shrinkage effect, the fabric may have a 40% - 50% elongation before shaping without fiber sanding process and can directly produce a sense of cashmere and be deeply dyed after heated and post-finished. It is applicable to high-grade leather, casual jacket and windbreaker and other fabrics.

## 2.3 特点及用途

(1)超细旦可染聚丙烯纤维：

具有质轻、保暖、防水及良好的芯吸效应和显著的透湿排汗性，且有丝绸般的光泽。用于高档内衣、专业运动服。

(2)超柔超强再生纤维素纤维：

具有柔软、色泽靓丽、抑菌、去油污、高强力等特点，用于针织内衣、床品、袜子、毛巾、牛仔、衬衫等。

(3)永久高弹性聚酯纤维：

弹性好，尺寸稳定性和染色均匀性良好，织造效率高，后加工容易，用于弹力服饰。

(4)高收缩涤 / 锦复合纤维：

具有较强的高收缩效果，面料定型前可有40%-50% 的伸长，织物不需磨毛加工，经加热后整理可直接产生绒感，染色深。适合于高档仿皮、休闲夹克及风衣面料等。

(5)仿绒轻柔聚酯纤维：

手感柔软滑糯、光泽好、抗起球、耐污、起绒织物绒直立性好、排斥弹性等。可用于织造高密防水织物、仿真丝织物、起绒产品和拉绒织物，主要用做春亚纺、灯心绒、珊瑚绒、桃皮绒等产品。

(6)亲肤抑菌聚乳酸纤维：

具有可降解性抑菌性亲肤性导湿排汗性、阻燃性、抗紫外性等特点。广泛用于内衣系列、童装系列、家纺系列、医疗卫生材料、内饰材料等。

## 2.4 应用技术

(1)超细旦可染聚丙烯纤维：

可与其他各种纤维(如棉、粘胶)混纺交织，可同时与其他纤维进行染色处理；常温常压染色可达中深色，高温染色可达深色。

(2)超柔超强再生纤维素纤维：

用于赛络纺、紧密纺、紧密赛络纺、涡流纺。

(3)永久高弹性聚酯纤维：

用于针织和梭织，针织一般采用强捻后大圆机织造。

(4)高收缩涤锦复合纤维：

用于针织和梭织绒感仿皮面料。针织物可用双面圆机织造，染整采用前处理、破幅、碱减量、预定型、染色、烘干、定型等工序。梭织可用经向和纬向编织，染整需要经过平幅精练、碱减量、预定型、染色、烘干、定型等工序。

(5)仿绒轻柔聚酯纤维：

用于高速加弹，喷水织机。

(6)亲肤抑菌聚乳酸纤维：

短纤可与天丝、棉、竹纤维混纺及纯纺；长丝纯纺或与其他纤维交织，用于针织和梭织。

## 2.5 关注品种

扁平聚丙烯腈纤维、醋酸腈纶复合纤维、仿棉聚酯纤维。



fabrics and silk like fabrics, fleece product and brushed fabrics, mainly used as polyester pongee, corduroy, coral velvet, peach and other products.

(6) Skin-friendly anti-bateria poly-lactic acid fiber: it has degradation, antibacterial, skin friendly, sweat perspiration, flame retardant anti-UV characteristics. It is widely used in underwear series, children's clothing series, hone textile series, medical and sanitary materials, interior decoration and other materials.

## 2.4 Application technologies

(1) Ultrafine denier dyeable polypropylene fiber: it can be blended and interwoven with other different fibers (such as cotton, viscose), or dyed together with other fibers; it can be dyed in medium dark at normal temperature and pressure or in the dark at high temperature.

(2) Ultra-soft and super-strength regenerated cellulose fiber: it is used for siro spinning, compact spinning, compact siro spinning and vortex spinning.

(3) Permanent high-elastic polyester fiber: it is used for knitting and weaving, the knitting is usually woven by using the circular knitting machine after strong twisting.

(4) High shrinkage polyester/nylon composite fiber: it is used for knitting and weaving cashmere leather-like fabrics. Knitted fabrics can be woven by using the double circular loom, the dyeing and finishing uses pre-processing, breaking pieces, alkali de-weighting and pre-shaping, dyeing, oven-drying, shaping and other processes. The weaving can use warp knitting and weft knitting, while the dyeing and finishing need to be subjected to open-width scouring, alkali de-weighting, pre-shaping, dyeing, oven-drying, shaping and other processes.

(5) Imitation cashmere soft polyester fiber: it is used for high-speed texturing, water jet looms.

(6) Skin-friendly anti-bateria poly-lactic acid fiber: the staple fiber can be blended with Tencel, cotton and bamboo fibers or directly spun; the directly spun filament or interwoven filament with other fibers is used for knitting and weaving.

## 2.5 Varieties concerned

Flat poly-acrylonitrile fiber, acetate acrylic composite fiber, cotton suede polyester fiber.

# 原液着色纤维
# 色彩流行趋势 春夏17

# COLOR FASHION TREND OF SPUN-DYED FIBER SPRING / SUMMER 17

| | | | | |
|---|---|---|---|---|
| PANTONE®14-4816 | PANTONE®16-1451 | PANTONE®15-0343 | PANTONE®13-0758 | PANTONE®15-3817 |
| PANTONE®17-4440 | PANTONE®19-1763 | PANTONE®17-5130 | PANTONE®14-0955 | PANTONE®19-3850 |
| PANTONE®19-4245 | PANTONE®16-1641 | PANTONE®17-6030 | PANTONE®13-0640 | PANTONE®19-2524 |
| PANTONE®18-4247 | PANTONE®18-1444 | PANTONE®16-5815 | PANTONE®12-0520 | PANTONE®807C |
| PANTONE®15-4020 | PANTONE®19-1528 | PANTONE®19-5212 | PANTONE®15-1049 | PANTONE®18-2143 |
| PANTONE®13-4111 | PANTONE®14-1418 | PANTONE®17-5126 | PANTONE®16-1448 | PANTONE®17-3617 |
| PANTONE®19-4033 | PANTONE®12-1404 | PANTONE®19-4914 | PANTONE®15-0953 | PANTONE®19-1522 |
| PANTONE®19-4007 | | PANTONE®16-5421 | PANTONE®19-1020 | |
| | | PANTONE®13-5305 | PANTONE®12-0712 | |


中国化学纤维工业协会 流行趋势研究与推广工作室
北京服装学院 纤维时尚工作室
国家纺织化纤产品开发中心
联合研究


**合作企业 / 纤维供应商**
**Cooperative Enterprises / Fiber Suppliers**

浙江金霞新材料科技有限公司
Zhejiang Jinxia Advanced Materials Technology Co.,Ltd.

滁州安兴环保彩纤有限公司
Chuzhou Anxing Color Fiber Co., Ltd.

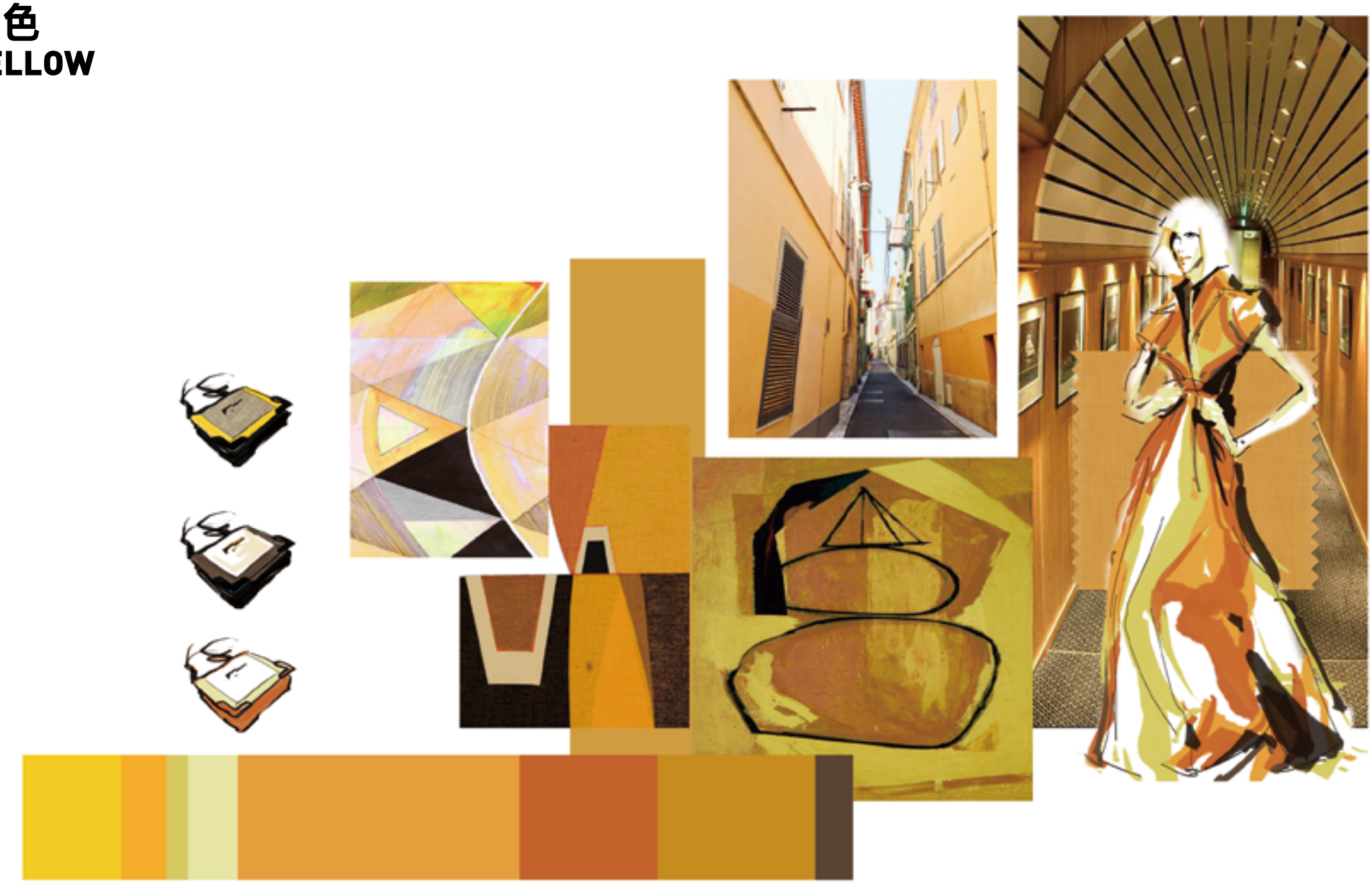
广东新会美达锦纶股份有限公司
Guangdong Xinhui Meida Nylon Co., Ltd.

江苏盛虹科技股份有限公司
Jiangsu Shenghong Science and Technology Co., Ltd.

# 绿色
# GREEN


清爽宜人的绿色将格外受到青睐，海绿色辽阔、宽广。
暗云杉色深邃、沉静。
鲜绿色生机勃勃。

# 黄色
# YELLOW



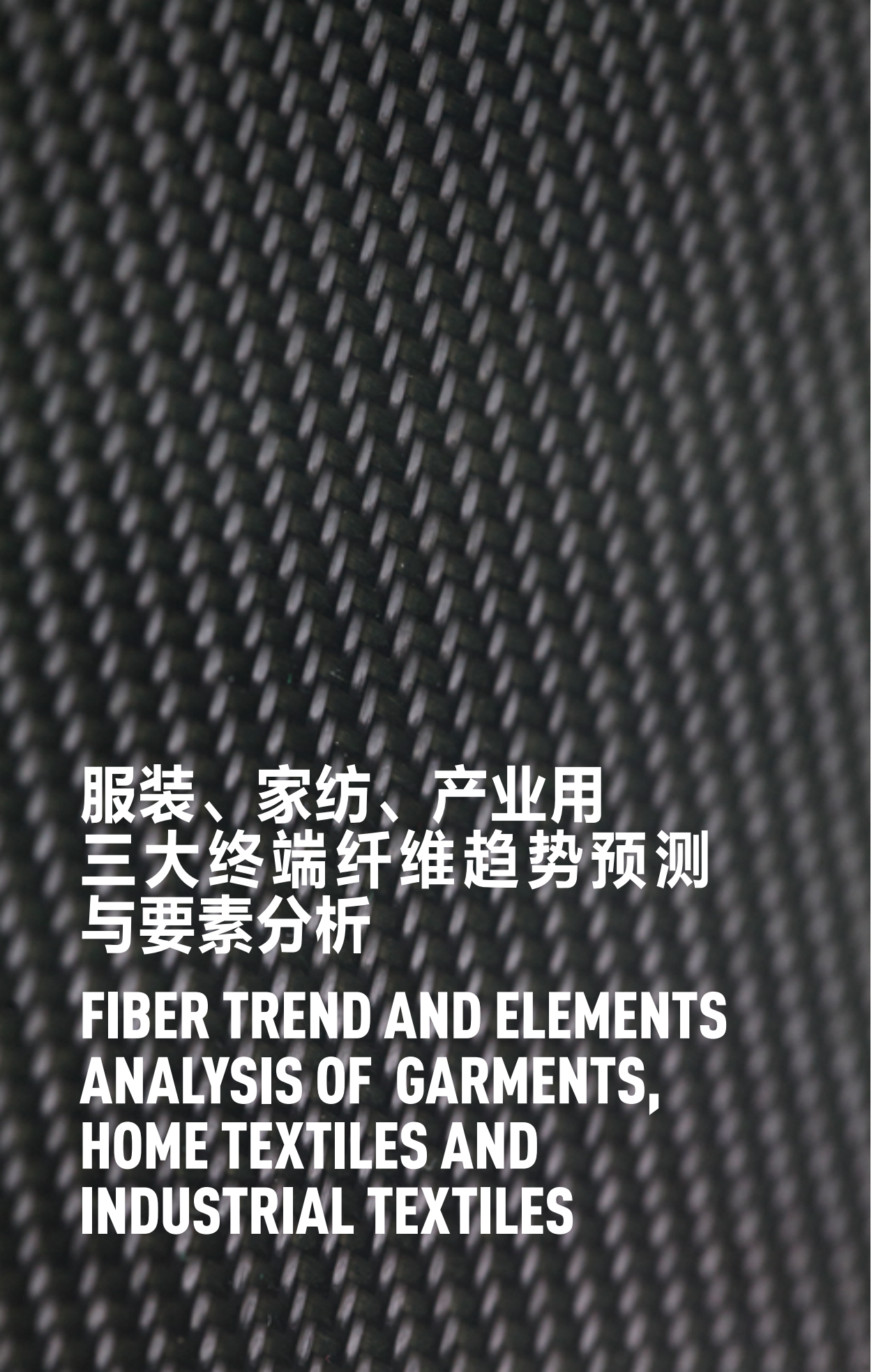
黄色给人感觉充满活力、时尚、明亮，象征着希望。
蒲公英色明快、亮丽，深橙黄色端庄典雅。
金黄色艳丽、耀眼，深棕色稳重、执着。

# 红色
# RED

温莎酒红色静谧、成熟。
旱金莲红热情洋溢，朝气蓬勃。
洋红色给人强烈的冲击，代表热情与活力。
蜜桃色清新、淡雅。

# 蓝色
# BLUE

沉着稳重的蓝色是春夏的基本色。
孔雀蓝经典依旧，波塞冬蓝冷静、理智。
辐射蓝美丽文静，多瑙河蓝宁静、明朗。



# 服装、家纺、产业用
# 三大终端纤维趋势预测
# 与要素分析

# FIBER TREND AND ELEMENTS ANALYSIS OF GARMENTS, HOME TEXTILES AND INDUSTRIAL TEXTILES

在“十三五”开局之年，围绕推进供给侧结构性改革这条主线，中国纤维流行趋势以“颠覆与重塑”为主题，推出“纤·呵护”、“纤·绿色”、“纤·智汇”、“纤·雅幻”四大篇章。为了更好地引领行业促新品、提品质、创品牌，推动产业结构调整升级，中国化纤协会对纤维流行元素及应用进行了调研，由业内权威专家从下游应用视角全面解读、深入阐释了中国纤维流行元素，并作出科学的预测分析。

In the first year of the “13th Five-year Programme”, centering on the structural reform on the supply side, the Chinese fiber trends, themed by "overthrow and remodeling" represent four chapters, those are, "Fiber·Care" "Fiber·Green" Fiber·Wisdom" and "Fiber·Elegance". To do better in leading the industry to promote new products, improve quality and create brands and promote the adjustment and upgrading of the industry structure, the China Chemical Fibers Association has conducted a survey on the fashion elements and application of fiber. Authoritative experts in the industry have given a comprehensive interpretation aand explained in-depth the fashion elements of Chinese fiber and made scientific predictions.

# 一 . 服装篇

## 1.1 休闲运动

休闲运动类服装不仅注重宽松、舒适等传统功能，还注入了当前时装的潮流性，体现出休闲着装的 “健康、青春、活力” 理念。

对于休闲运动服装，“吸湿排汗、轻便、弹性”已成为基本的流行要素，“凉感、抗菌、抗紫外”则是健康衣着的追求，与电子技术结合是健康休闲的发展方向。细旦柔性纤维、异型导湿纤维、杂化功能纤维开发与应用则为流行服饰提供了基础保障和流行新趋势。

关注的纤维品种：异形导湿聚酯纤维，异形聚丙烯纤维，超细旦聚酰胺 6、聚酯、聚丙烯纤维，耐高温聚氨酯纤维，抗紫外聚酰胺 6 纤维等。

## 1.2 时尚内衣

时尚内衣既要注重 “亲肤、柔软、吸湿排汗” 等基本要素，又要附加 “抗菌防臭、弹性、凉感、保健” 等功能舒适性需求，以达到呵护和保养人体作用。

亲水细旦仿棉纤维、超细旦纤维能够通过细旦柔软实现内衣的接触舒适性；高弹性纤维可以运用　染亲肤纤维成为时尚内衣的另一新趋势。

关注的纤维品种：抑菌防臭 PA 纤维、亲水细旦仿棉 PET 纤维、壳聚糖纤维、超细旦 ( 莫代尔、雅赛尔 ) 纤维、高弹性 PU 纤维、细旦 PP 纤维 ( 疏水导湿 ) 等。



# 1. APPAREL

## 1.1 Casual and sportswear

Casual and sportswear not only pays attention to its traditional functions such as loose and comfortable but has also added current fashion elements, which show the "healthy, young and vigorous" ideas of casual wear.

For casual and sportswear, "being absorbent and sweat releasing, light, portable and resilient" have become its basic fashion elements, while "being cool, antibacterial and UV-resistant" are elements of healthy apparel. The combination with electronic technology is the development direction of healthy casual wear. The development and application of fine denier flexible fiber, special-shaped moisture barrier fiber have provided basis and new trends for fashion apparel.

Fiber types to pay attention to: special-shaped moisture barrier Dacron (PET fiber), polypropylene fiber (PP fiber), super fine denier nylon (PA), PET, PP fiber, highly resilient spandex (PU fiber), UV-resistant, temperature-control PA, PET fiber, etc.

## 1.2 Lingerie

Lingerie needs to be "soft and absorbent" and also be "antibacterial, odor-resistant, cool and have health function, to care and the human body.

Hydrophilic fine denier cotton-like fiber and super fine denier fiber can make lingerie comfortable; highly resilient fiber can be used to make corsets and body contouring; healthcare fiber can help prevent diseases. Non-dyeing or easy-dyeing fiber has become a new trend in lingerie.

Fiber types to pay attention to: antibacterial and odor-resistant PA fiber, hydrophilic fine denier cotton-like PET fiber, chitosan fiber, super fine denier fiber (modal, gracell), high elastic PU fiber, fine denier PP fiber (moisture absorbing), etc.

### 1.3 牛仔工装

根据应用场合的不同，牛仔装注重“透气、弹性、耐磨、柔软”；车间工作装不仅要“耐磨、耐污、易洗快干”，还要“吸湿排汗、抗静电、耐洗、防皱免烫”；特种功能服则根据工作用途，在“防静电、阻燃、耐高温、耐腐蚀、抗静电、防蚊、防辐射、防电弧”等方面需求各不相同。

根据工装需求，纤维的“耐磨性、透气性、弹性”是共性发展要素和流行趋势。

关注的纤维品种：高弹性聚氨酯纤维、亲水易染仿棉聚酯纤维、阻燃无染再生纤维素纤维、天丝、高弹PTT/PET复合纤维等。

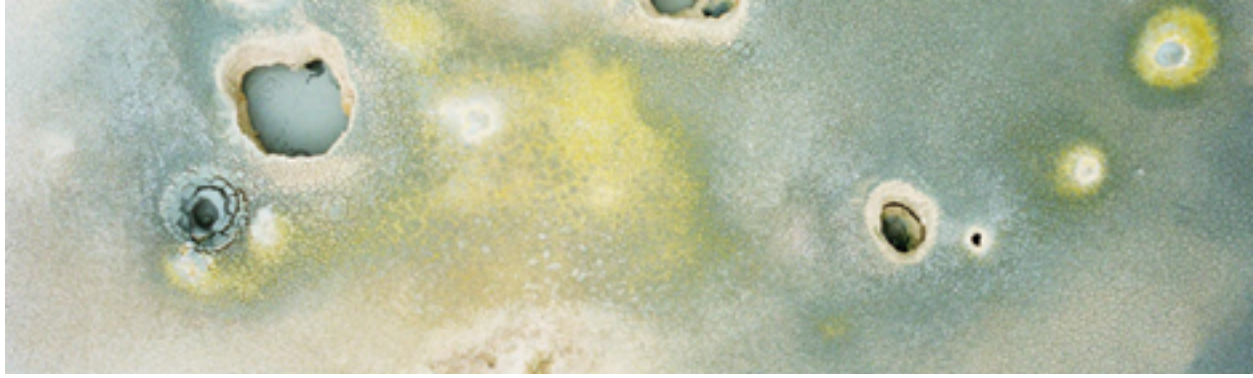
### 1.4 西装礼服

西装礼服注重仪容仪表与舒适性，关注“悬垂、抗皱、耐磨”等基本要素，对“抑菌、吸湿透气”等方面也有着安全舒适性需求。

西装在传统上以羊毛含量标定档次，但是羊毛存在质重、不耐磨、易起球的不足，因此功能性的聚酯纤维、再生纤维素纤维等被用来增加面料的手感和弹性，以满足不同层次西装礼服的需求。

关注的纤维品种：亲水易染仿棉聚酯纤维、抑菌聚酯纤维、功能粘胶纤维等。

东华大学 朱美芳团队



### 1.3 Denim

Denims emphasize the "breathable, resilient, abrasion-resistant and soft" functions, based on their intended uses; workshop denims not only need to be "abrasion-resistant, stain-resistant, easy-to-wash and fast-drying", but also "moisture-absorbing, anti-static, washable, crease-resistant and easy-care"; special functional wear hasdifferent requirements depend on its application, ranging from "static resistance, flame resistance, high temperature resistance, corrosion resistance" to "mosquito resistance, radiation resistance and electric arc resistance".

According to requirement of denim, the "abrasion-resistant, breathable and resilient" of fiber are the common development factors and fashion trends.

Fiber types to pay attention to: Highly resilient PU fiber, memory high-resilient PTT/PET composite fiber, hydrophilic easy-dyeing cotton-like PET fiber, tencel fiber, flame-resistant non-dyeing viscose fiber, functional PA6 fiber, functional polyphenylene sulfide (PPS) fiber, etc.

### 1.4 Suits

Suits stress appearance and comfort and some basic elements as "drapability, crease resistance and abrasion-resistance". It also has other demands such as "bacteria resistance, moisture absorption and breathability".

Traditionally suits are graded based on wool content. However, as wool does not wear well and is easy to pill, functional fibers such as polyester fiber and viscose are often used to increase the feel and resilience of fabric to meet the demands of suits of different grades.

Fiber types to pay attention to: wool fiber, hydrophilic easy-dyeing cotton-like polyester fiber, antibacterial polyester fiber, functional viscose , man-made wool, blend fiber, etc.

Zhu Meifang Group, Donghua University

# 二 . 家纺篇

## 2.1 床上用品

床上用品的时尚性、舒适性和功能性仍然是消费者关注的基本需求，为了能够满足人体生理卫生需要，床上用品应具有亲肤、柔软、吸湿透汽等舒适性能，为了能够赋予床上用品更高的使用价值和附加值,也应具有抑菌防臭、抗螨、阻燃、抗静电等安全保健功能，同时，为了更易于打理，也应具有易洗快干、耐污、抗皱等易护理性。

近年来，人们对安全健康和环境保护意识的增强，床上用品的安全性及环保性越来越受到人们的重视。因此，2016/2017 致力于开发对生态、环境以及消费者安全无害的环境友好型床上用品已成为必然趋势。

关注的纤维品种：仿棉聚酯纤维、超细及异形的聚酯和聚酰胺纤维、新型的再生纤维素纤维、海藻及甲壳素等生物基纤维、可降解的合成纤维、防螨／阻燃／抗静电／抗菌防臭等功能纤维、负离子及竹炭纤维、循环再生纤维等。

## 2.2 窗帘装饰

窗帘是家居装饰的重要组成部分，跟人们的生活息息相关。窗帘设计的流行趋势中包括很多元素，如造型、色彩、材质等等。作为一种家纺产品，窗帘最基本的作用就是调节光线.随着生活水平的提高、生活方式的变化、科技水平的进步，人们对窗帘的功能性及装饰性都提出了更高的要求。

2016/2017 年，窗帘流行趋势突出耐晒、防透视、阻燃、耐污染、防紫外线、隔热保温、隔音、香味、除异味、形态记忆、环保等重要因素。窗帘的色彩以绿色、蓝色、大地色、白色、灰色等接近自然的浅色调为主，提倡简约主义，营造轻柔而舒适的氛围。

关注的纤维品种：防透视循环再生纤维、无染阻燃抗紫外聚酯纤维、全消光抗紫外阻燃聚酯纤维及无染纤维等。



# 2. HOME FURNISHINGS

## 2.1 Bedding

Regarding bedding, fashion, comfort and functions are still the basic factors that consumers pay attention to. To meet the physical hygiene requirements of human body, bedding needs to be skin-friendly, soft, moisture-absorbing and breathable. To increase the use value and added value of bedding, bedding also needs to have safety,healthcare, resistance to bacteria, odor, mites, flame and static. At the same time, to make it easy to care, it also needs to be fast-drying, stain-resistant and crease resistant.

In recent years, as customers' awareness of safety, health and environmental protection is increasing, they are paying more attention to the safety and environmental protection property of bedding. Therefore, the development of ecological, environmentally-friendly, safe and harmless bedding will be an inexorable trend in 2016/2017.

Fiber types to pay attention to: cotton-like polyester fiber, super fine and special-shaped polyester and polyarmide fiber, new regenerated cellulose fiber, regenerated fiber such as alginate and chitin fiber, degradable synthetic fiber, functional fibers such as mite-/flame-/static-/odor-resistant/antibacterial fibers, anion and bamboo carbon fiber, regenerated fiber, etc.

## 2.2 Curtains

Curtains are an important part in home furnishings and are closely related to everyday life. The trends of curtains involve many elements, such as styles, colors, materials, etc. As a home furnishing product, the basic function of curtains is to adjust light. With the improvement of living standard, the changes of lifestyle and the advance of technology, people now have higher requirements on the functionality and decorative function of curtains.

In 2016/2017, the trends of curtains will include resistance to sunlight, see-throughness, flame, stain and UV, thermal insulation, sound insulation, smell, resistance to odor, form memory, environmental protection, etc. The colors of curtains are mainly natural light colors like green, blue, earth color, white and gray, which emphasize simplicity and create a soft and comfortable atmosphere.

Fiber types to pay attention to: anti-see-through polyester fiber (regenerated), non-dyeing, flame- and UV-resistant polyester fiber, full-dull flame- and UV-resistant polyester fiber, regenerated fiber, non-dyeing fiber, etc.

## 2.3 填充物

填充物注重保暖性、轻质蓬松性、回弹性、耐洗性抗撕拉性及保形性能兼顾无异味、防发霉变质等特性。天然纤维、合成纤维、再生纤维、羽绒类等均可作为填充物使用。

随着人们生活水平的不断提高，消费者对纤维填充物的要求也愈来愈高。2016/2017 纤维填充物以保暖、轻质、亲肤保健、阻燃、抗菌防螨、远红外等功能性为主要的流行趋势。注重利用环保、可再生资源。

关注的纤维品种: 聚丙烯纤维、阻燃纤维、远红外纤维、蛋白纤维、负离子纤维、聚酰亚胺纤维、芳纶等。

—— 北京服装学院 王锐团队

## 2.3 Filler

Filler stresses thermal insulation, lightness, fluffiness, rebound resilience, washability, tear growth resistance and shape keeping performance. It also emphasizes odor, mildew and deterioration resistance. Natural fiber, synthetic fiber, regenerated fiber and down fiber can be used to make filler.

With the improvement of the living standards, people have higher requirements on fiber filler. The main trends of fiber filler in 2016/2017 will be fiber with such functions as thermal insulation, light, skincare, flame resistance, resistance to bacteria and mites, and far infrared. And it will stress the use of environmentally-friendly and regenerated resources.

Fiber types to pay attention to: regenerated polyester fiber, polyacrylonitrile fiber, polypropylene fiber, flame-resistant fiber, far infrared fiber, azelon, anion fiber, polyimide fiber, aramid fiber, etc.

—— Wangrui Group, Beijing Institute of Fashion Technology

# 三 . 产业用纺织品篇

### 3.1 环保材料

(1)大气和水污染控制关乎环境质量和生命健康。新型纤维材料分离及防护技术是当前公认的、能有效实现烟气除尘、脱硫脱硝、硫尘过滤与捕集以及空调、洁净室、汽车尾气、PM2.5 口罩等高效过滤和个体防护的关键技术。高效低阻和耐高温性能是高性能纤维过滤材料开发重点和关注的重要功能要素。

气体过滤用高效分离纤维材料要求过滤纤维直径纤细，纤维填充密度高；同时还要求纤维耐温性能好，至少高于 100 ~ 250℃，断裂强度高，不小于 5cN/dtex，纤维钩接强度应较高，断裂伸长率应在 15% 左右，良好的耐酸、碱及有机溶剂腐蚀性、吸湿性、耐磨性、阻燃性和可纺性等。

(2)水处理用中空纤维膜分离技术已成为解决水资源、环境等领域问题的共性技术，广泛应用于工业废水、生活污水处理,也常用于电子行业高纯水制备等。中空纤维膜功能化和高性能化，特别是高抗污染性、高分离精度和高选择性以及具有特种分离功能的中空纤维膜材料及膜过程是当前关注重点。

水处理用中空纤维膜主要包括微滤膜、超滤膜、纳滤膜和反渗透膜。通常要求中空纤维膜材料具有良好的成膜性能、尺寸稳定性、热稳定性、耐溶剂（水）稳定性和力学性能以及膜表面亲疏水调控性能等。

关注的纤维品种：聚四氟乙烯纤维、间位芳纶、聚苯硫醚纤维、芳砜纶、聚酰亚胺纤维、驻极体纤维、聚丙烯改性新型吸油纤维、活性碳纤维等。



# 3. INDUSTRIAL TEXTILES

### 3.1 Environmentally-friendly materials

(1) Air and water pollution relate to environmental quality and health. The separation and protection technology is a key universally accepted technology that can effectively realize fume removal, desulfurization and denitrification, sulfur dust and provide efficient filtration and individual protection in air conditioning, clean rooms, automobile exhaust and PM2.5 masks. Efficient low resistance and high-temperature resistance are the key points and important functional elements in the development of high performance of filtering fiber materials.

The efficient separation fiber materials used in gas filtration should have fine fiber diameter , high fiber filling density, excellent high-temperature resistance (100~250°C), excellent breaking strength (no less than 5cN/dtex), high loop tenacity, with an elongation at break of about 15%, excellent resistance to corrosion of acid, alkali and organic solvents, moisture absorption, abrasion resistance, flame resistance and spinnability.

(2) The hollow fiber membrane separation technology used in water treatment has become a common technology applied to solve problems in the water resource and environmental fields and is widely adopted in treatment of industrial wastewater and domestic sewage, as well as in the preparation of high purity water in the electronic industry. The functions and high performance of hollow fiber membranes, especially the high resistance to pollution, high separation accuracy and high selectivity, and the hollow fiber membrane material and membrane process with special separation functions are the current focus areas.

The hollow fiber membranes in water treatment mainly include micro-filtration membrane, ultrafiltration membrane, nanofiltration membrane and reverse osmosis membrane. Generally hollow fiber membrane materials should have excellent film-forming property, dimensional stability, thermal stability, solvent (water) resistance stability, mechanical property and hydropathy control function on membrane surface.

Fiber types to pay attention to: polytetrafluoroethylene(PTFE) fiber, aramid fiber 1313, polyphenylene sulfide (PPS) fiber, polysulfonamide (PSA), polyimide (PI) fiber, electret fiber, modified oil-absorbent polypropylene fiber, activated carbon fiber (ACF), etc.

## 3.2 结构增强材料

结构增强材料是由增强纤维通过纺织加工方法获得的二维或三维形式的纤维集合体。纺织复合材料要满足高强度、高弹性模量化，轻量化、多功能化、智能化及低成本的发展需要。对于用于不同载荷和湿 / 热环境下的复合材料，除了常规力学性能要求外，材料还应具有较高的强度和刚度保持率,材料成型性好,机械加工性好、易于维护、修理，可以多种形式供应等工艺性要求，对于特殊要求的部件还应满足如阻燃、燃烧毒性、透波性、吸波性、电磁性等要求。

结构增强材料力学性能主要由纤维的性能、纤维束的捻度、几何交织结构中纤维束取向及分布等决定的。纤维值得关注的力学性能包括纤维的拉伸强度,弹性模量、断裂伸长率，其次对于特定的性能要求，还要考虑纤维的密度、线膨胀系数、热导率和电阻率等物理特性。

关注的纤维品种：高硅氧玻璃纤维和特种玻璃纤维,碳纤维,陶瓷纤维中的氧化铝、碳化硅、氮化硼和硼纤维、也包括各种新型高性能纤维品种如,芳香族聚酰胺纤维、聚芳酯纤维、有机杂环类纤维（聚苯并二噁唑、聚苯并噻唑、聚苯并咪唑纤维）和超高分子量聚乙烯纤维等。

## 3.2 Structural reinforcing materials

Structural reinforcing materials are two-dimensional or three-dimensional fiber assemblies obtained through textile processing of reinforced fibers. Textile composites need to meet such development requirements as high strength, high elasticity modulus, light weight, multi-functions, intellectualization and low cost. Regarding the composite materials used in different load and humidity/heat environmental conditions, besides general mechanical properties, the materials should also have relatively high strength and rigidity retention rate, good formability and machinability, be easy to maintain and repair and can be supplied in various forms. Regarding parts with special requirements, they should meet such requirements as flame resistance, combustion toxicity, wave transmissivity, wave absorption and electromagnetism.

The mechanical properties of structural reinforcing materials are mainly determined by the characteristics of fiber, twist of fiber bundles and the direction and distribution of fiber] in geometric intertexture. The mechanical properties of fiber include the tensile strength, elasticity modulus and elongation at break. For some special requirements on performance, it is also necessary to consider the physical characteristics of fiber such as density, linear expansion coefficient, thermal conductivity and electrical resistivity.

Fiber types to pay attention to: glass fiber, high silica glass fiber and specialty glass fiber, carbon fiber, ceramic fiber(alumina, silicon carbide, boron nitride and boron fiber), as well as some new high performance fiber, such as aromatic polyamide fiber, polyarylester fiber, organic heterocyclic fibers ( polybenzoxadiazole (PBO) fiber, polybenzothiazole (PBT) fiber and polybenzimidazole (PBI) fiber), ultra high molecular weight polyethylene fiber.

## 3.3 交通运输材料

汽车工业的高速发展给纤维材料的应用带来了新的机遇。对于交通运输用纤维材料的要求主要包括外观特性和功能特性。在外观特性要求方面，要求可进行工程化设计及设计的工艺性，同时今后将更加关注个性化的创意设计。在功能特性要求方面，随着汽车轻量化、节能化、电动化和环保化的趋势，对交通运输用纤维的功能也提出了更高的要求，其主要要素包括轻量化、补强性、耐热性、隔热性、吸音性、隔音性、难燃性、柔软性、弹性回复性等。

纤维材料在汽车工业中的应用包括座椅面料、汽车内饰、隔音 / 隔热绝缘材料、顶棚材料、轮胎帘子线、安全带、安全气囊、刹车片、过滤材料等，新型纤维复合材料也将广泛应用于汽车和其他交通工具中，电池隔膜纤维材料也应用于新型电动汽车中。

为满足汽车工业对于安全性、轻量化、节能环保的更高需求和新能源动力汽车的开发，对于汽车用纤维提出了更高的性能要求：更高的比强度、比刚度，密度低，耐冲击，耐腐蚀、耐老化，热膨胀系数小，尺寸稳定性好等，同时应在满足性能要求的前提下降低成本。

### 关注的纤维品种

(1) 汽车、飞机轻量化：碳纤维、超高分子量聚乙烯纤维、玻璃纤维、玄武岩纤维、高强高模聚酯纤维；

(2) 内饰用纤维材料：再生中空聚酯纤维、超细旦纤维、海岛纤维、熔喷超细聚丙烯纤维、聚苯硫醚纤维、芳纶等。

—— 天津工业大学 程博闻团队



## 3.3 Transportation materials

The rapid development of the auto industry has brought new opportunities for the application of fiber materials. The requirements of the fiber materials used in transportation mainly include appearance characteristics and functional characteristics. In terms of the requirements on appearance characteristics, it requires that the fiber materials can be used in engineering design and have design manufacturability. Meanwhile, individual creative design will be stressed in the future. In terms of the requirements on functional characteristics, as light, energy-saving, power-driven and environmentally-friendly automobiles are becoming a trend, higher requirements have been raised on the functions of fibers used in transportation materials and the main elements include light weight, reinforcing ability, heat resistance, heat insulation, sound absorption, sound insulation, flame retardance, softness and elastic recovery.

The application of fiber materials in the auto industry includes seat fabric, car interior, sound/heat insulation materials, ceiling materials, tire cords, safety belts, airbags, brake pads and filtration materials. New-type composite fibers will be widely used in automobiles and other means of transportation, and battery diaphragm fibers will be used in new-type electric vehicles.

To meet the higher demands on safety, light weight, energy conservation and environmental protection of the auto industry, and the development of new energy vehicles. higher performance requirements on auto fibers have been raised: higher specific strength and specific stiffness, low density, resistance to impact, corrosion and aging, small coefficient of thermal expansion and excellent dimensional stability and lower cost while meeting performance requirements.

Fiber types to pay attention to:

(1) Light weight fibers used in vehicles and aircrafts: carbon fiber, ultra high molecular weight polyethylene fiber, glass fiber, basalt fiber, aromatic polyamide fiber, high strength and high modulus polyester fiber;

(2) Fibers used in interior: generated hollow polyester fiber, super fine denier fiber, sea-island fiber, melt-blown super fine fiber, PPS fiber, aramid fiber, etc.

—— Cheng Bowen Group
Tianjin Polytechnic University


# 在定性和定量中前进的设计学

从无到有从简单到融会贯通中国纺织化纤行业一路走来已成为世界纺织化纤生产大国。而今面对内部新兴经济体发展放缓、结构调整和外部严峻竞争环境的双重压力，中国纺织化纤企业需要有更宽广的视野来把握未来发展的大趋势，逆流而上，实现技术升级，跻身成为化纤生产强国。而在这条不断探索、努力创新的道路上，多维的定位坐标是每个企业都需要考虑的。

首先，每个企业在其纺织行业中上下游的整合是势在必行的。毫无疑问，无论是在改善提高纤维性能或是设计相关高效生产设备方面，中国纺织纤维业已具有其自身特色的竞争力和自主技术研发能力。但建立中国制造的认可度和提高其在国际市场上的先进领导能力，还需企业建立自己的本土产品品牌。这不仅需要基于一直以来强调的在科研技术上的投入产出，更依赖于整个企业链的上下整合。企业通过在垂直方向上的紧密联系，对不断变化的市场做出快速反应，可以将其在纤维基础层面上的进步，富有变化的运用于新产品的设计生产，最终转换为终端消费者真真切切能够体会到的福利。但这需要企业对从原材料的开取到最后对消费者认识新产品的意识培养都有相当的投入。所以一条完整并迅速反应的信息渠道需要被建立，整个纺织行业从原材料的选取到生产技术改进运用，再到品牌形象的建立培养和市场推广这些不同环节上，按所需不同，提供相应的技术支持，保持开放的交流，最终实现互利共赢。在整合的过程中，信息的迅速反映最为重要，集思广益、提供大型交流平台，创立纺织大数据，在分享的过程中撞击出新火花，创造上下游共同产品开发携手前进的更多可能性。

# SOURCES OF DESIGN, HIGHLIGHTS OF BRAND

From nonexistence to pass into existence, from simpleness to mastery through a comprehensive study, the Chinese textile fiber industry has made China a large manufacturer of chemical fibers in the world. Faced with double pressures as the development of China's emerging economy slows down and China's economy is undergoing structural adjustment, and the severe external competitive situation, Chinese textile fiber enterprises need to have a broader vision when considering the general trends in future development, to make way up despite difficulties, realize technology transformation and make China a strong manufacturer of chemical fibers. While making explorations and striving for innovation, all enterprises should consider establishing a multi-dimensional positioning strategy.

以笔者研究组为例，团队的技术核心为艺术设计，以服装工程专业人士为主要动力，辅以物理，化学，生物，和商业背景的博士后、博士生和研究人员组成了一个极具综合能力的研究开发团队。我们近十年的工作都致力于学习不同性能的化学纤维并加以灵活的应用，其中包括导电纤维，中空纤维，冰爽纤维和壳聚糖纤维。导电纤维应用于开发功能性发热服装，此研究在 2014 年日内瓦国际发明大赛上取得银奖；中空纤维应用于医用临床载药，此研究获得 2014 年香港自然科学基金资助；冰爽纤维应用于功能性人造皮革，此研究于 2013 年获得香港政府创新科技基金支持并优质结题，正待产业推广；壳聚糖纤维应用于儿童 EB 疾病的治疗，此研究受山东海斯摩尔生物科技有限公司和香港科技署赞助，社团法人台湾泡泡龙病友协会合作进行中。中国的化纤行业已走在世界的前沿，而我们的研究成果也得益于整个行业所取得的成绩，在此基础上拓宽发展，收到了学界和业界的一致认可，已在科学引文索引发表 50 余篇高影响因子研究论文，其中大多为世界领先期刊，例如 The Design Journal，Textile Research Journal 和 Advance Materials。在过去 10 年的科研生涯中，我们团队获得了多个由香港政府科技署资助的学术项目，成功与多个本地及国际品牌服饰公司在多项科研课题合作；拥有 4 个美国专利和 7 个中国专利，成果已成功授权于香港和国际的商业用途。同时一些技术成果还获得了多个国际奖项，例如第 42 届日内瓦国际发明奖项。这些将基础的先进化学纤维转化为实际的商业用途，证明对其应用的开发破在眉睫。为了解决当今与未来可能产生的问题，打破高度细分学科和产业的界限，交叉学科的兴起已经成了学界最流行的手段。服装设计作为艺术的一个应用分支，上承纺织技术和中上游工业，下载人文情怀和商业资本，位置特殊且重要。设计师在其中如何解放思想，在技术探索的领域中，真正的自由地表达这种承上启下，对新科技技术的推广和新工业的组合至关重要。


服装设计作为艺术的一个应用分支，上承纺织技术和中上游工业，下载人文情怀和商业资本，位置特殊且重要；

Fashion design, as a branch of artistic application, vertically integrates textile technology, the upstream industry with humanistic feelings and commercial capitals in the downstream, acting as a key link in the pipeline.



First, the integration of the upstream and downstream of the textile industry is imperative. Undoubtedly, no mater in improving fiber performance or in designing relevant efficient production equipment, the Chinese textile fiber industry has formed its own characteristic competitiveness and independent technology research and development ability. However, to build the recognition of "Made in China" and raise its advanced leading ability in the international market, the enterprises need to build their local product brands, which not only requires the input and output of scientific research technology that have long been emphasized but also relies on the integration of the upstream and downstream of the whole industrial chain. The quick response of the enterprises to the ever-changing market through close contact in the vertical direction can help the enterprises apply their advance in fiber in the design and production of new products in various ways and finally transform it into the benefits that the end consumers can truly experience. However, that requires the enterprises to invest considerably in from the obtaining of raw materials to the cultivation of consumers' awareness of new products. Therefore, a complete and quick-response information channel needs to be established, through which the different links of the whole textile industry including selection of raw materials, improvement and application of production technology, brand image cultivation and market promotion can provide corresponding technical support to each other based on their different demands, keep an open communication and finally realize a win-win situation. In the whole process of integration, quick action to information is the most important. By drawing on the wisdom of the masses, providing a large communication platform, creating big data on textile, it can strike new sparkles in the sharing of information and create more possibilities for the common progress of the downstream and upstream of the industry.

Take the author's research team for example. The technical core of the team is art design. Professionals in apparel engineering are the main forces, assisted by post-doctors, doctoral students and researchers with a physics, chemical, biological, or business background, which have formed a research and development team with strong comprehensive ability. In the past decade, we have been committed to studying chemical fibers of different properties and applying them flexibly, including conductive fiber, hollow fiber, cool fiber and chitosan fiber. Conductive fiber is used to develop functional heating clothes. The invention won a silver medal at the 2014 International Exhibition of Inventions of Geneva. Hollow fiber is used in clinical medicine carrying. The research won subsidies from the National Science Foundation for Hong Kong in 2014. Cool fiber is applied in functional artificial leather. The research obtained the support of the Innovation & Technology Foundation of the Government of the Hong Kong Special Administrative Region in 2013 and has been concluded and is waiting for industrial promotion. Chitosan fiber is used in the treatment of children's EB disease. The research was supported by Hismer Bio-technology Co., Ltd. and the Innovation and Technology Commission of Hong Kong, and was carried out in cooperation with Taiwan Paopaolong Patients Association. The Chinese chemical fiber industry is now in the leading position in the world, and our research results have benefited from the achievements made by the whole industry and our research has been conducted on that basis. We have gained unanimous recognition in the academic circle and industry. We have published over 50 high-impact research papers in science citation indexes, most being world-leading periodicals, such as The Design Journal, Textile Research Journal and Advance Materials. In the research and development in the past decade, our team have gained a number of academic projects supported by the Innovation and Technology Commission of the Government of the Hong Kong Special Administrative Region, cooperated with a number of local and international clothing brands in scientific research projects; we have obtained four United States patents and seven Chinese patents; and our research results have been successfully authorized for commercial use in Hong Kong and internationally. At the same time, some technological results have won international awards, including the silver medal at the 42th International Exhibition of Inventions of Geneva. That the basic advanced chemical fibers are transformed into practical commercial use has proved the urgency in the development of the application of chemical fibers. To solve current and future problems that may occur and break the boundary between highly segmented disciplines and the industry, the rise of interdiscipline has become the most popular means in the academic world. Clothing design, as a branch of the application of art, has textile technology and upstream and downstream industry on one hand and cultural contents and commercial capital on the other, being placed in a special and important position. It

再者从水平方向来看，多元化的养分和发展也至关重要。如今对纺织材料的运用已不再局限于过往传统的定义，更多新型材料被运用于航天、建筑、医疗、防护等行业。而如何长远地在这条路上寻求可持续的发展并创造更多的可能性，则需企业将关注力不再局限于本身，更多地投射于整个世界各个领域里先进技术的突破和其行业存在的技术障碍等。通过不同学科行业的交叉，可创造一片丰富养分的发展土壤，营造一个更加健康多姿的终端市场。

最后也是最重要的，无论是产业链上下游的紧密整合还是放眼于不同行业领域的多元化发展，都需要具有较高综合素质的优秀人才来支持和执行。所以中国纤维企业如何海纳百川，将各个领域的优秀人才召入麾下发挥其不同特长，并同时培养本行业人员的综合灵活运用能力，都将是一个新的命题。

在这个上下而求索的过程中，我们基于多元化的土壤，寻求交叉的火花碰撞，依赖于信息技术人才的扶持，通过艺术和科学，用不同的方式表达人与自然社会的关系，基础纤维的一小步前进都将为整个终端市场带来更多的可能，创造更多消费者能够直接体会到的多姿多彩。

我们期待我们的时代，设计师的时代。


功能性发热服：a 服装设计细节；b 服装设计样品；c 具有颈部加热功能的发热服装，温度可达 43 摄氏度（通过红外摄像测得），用以治疗颈部酸痛。

Thermal garment: a) garment details; b) prototype; c) thermal garment with a heating function on the neck for heating to below 43 °C (as detected by an infrared camera) to treat neck aches

is of vital importance that designers liberate their thinking and truly express themselves in the exploration of technology and combine new technology with new industry.

In the horizontal direction, diversified nutrients and development is also very important. Today the application of textile materials is no longer limited to traditional use. More new-type materials are now applied in the aerospace, building, medical and protection industries. To realize sustainable development in the long run and create more possibilities, the enterprises need to pay more attention to the breakthroughs in advanced technology in different fields in the whole world and the technical obstacles in the industry. The interaction of different disciplines and industries may create a development soil with rich nutrients and a healthier and more diversified end market.

Last but not least, both the close integration of the upstream and downstream of the industrial chain and the diversified development of different fields need the support and execution of excellent talents with relatively high comprehensive qualities. Therefore, how Chinese fiber enterprises gather wisdom, call in excellent talents from different fields and make use of their specialties while cultivating the comprehensive flexible application ability of the staff in the industry will be a new research subject.

In the exploration, based on the diversified soil, we seek the sparkles from the interaction of different disciplines and industries, rely on the support of information technology talents, and express the relationship between man and nature and society in different ways through art and science. The minor step in basic fibers will bring more possibilities to the whole end market and create more diversities that consumers can directly experience.

# 纤维创新引领时尚变革

“衣食住行”，衣为首，强调的是服装与国民生活的密切关系。人们对服装的需求层次丰富，涵盖从基本的遮羞、保暖，到更高层次的社会性需求。作为服装设计师，设计的不仅是基本功能产品，更是一种生活方式，一种生活态度。

纤维材料是时尚创新设计的基础。近年来，功能性纤维的蓬勃发展，使时尚业更多元，越来越多的设计师正在尝试新的、更具未来意义的设计理念。

### 1. 纤维的功能升级推动人本设计

服装设计师要能发现需求，引导需求。服装设计的本质是消费者需求的满足，有些需求是消费者提出的，有些是无意识的。好的设计师要尊重消费者，设计的服装应该舒适、耐穿、易打理，做到以人为本。传统纤维的功能改性，及新型纤维的出现，使服装变得更“易穿”。通过改良纤维，使工作时的正装下班后可以变成休闲装，而不用担心传统正装面料容易出现的变形、褶皱等问题；冲浪服装品牌 Quiksilver 生产了首款冲浪西装 —— 一款西装与潜水服的结合体，这套冲浪西装上得了宴会派对、下得了大海冲浪。

一衣多穿 —— 兼具正装和休闲装功能

Versatile clothing: suits to wear at work and after work



# FIBER INNOVATION LEADS FASHION REVOLUTION

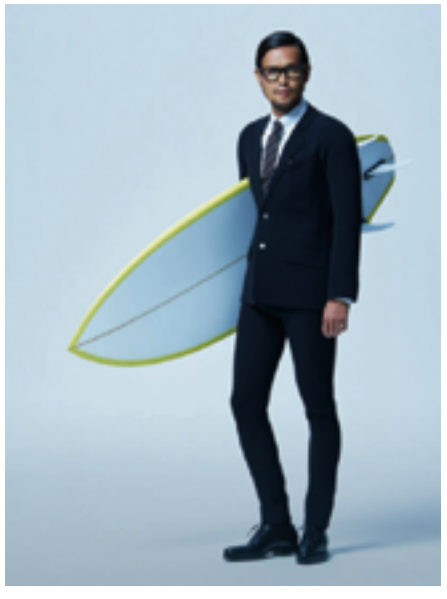
In the Chinese phrase "clothing, food, shelter and transportation" (basic necessities of life), "clothing" is the first word, which emphasizes the close relationship between clothing and everyday life. The demands for clothing range from basic covering and keeping warm to higher social demands. Fashion designers design not only a product with basic functions but also a lifestyle and an attitude towards life.

Fiber materials are the basis of innovative fashion design. In recent years, the vigorous development of functional fibers has made the fashion industry more diversified and urged more and more designers to try new and futuristic design ideas.

### 1. The upgrading of functions of fiber

Fashion designers need to discover and guide demands. The nature of fashion design is to meet consumer demands. Some demands are raised by consumers and some are unconscious. A good clothing designer needs to respect consumers and make the clothing comfortable, durable and easy to care and make sure it is people-oriented.

The functional modification of traditional fibers and the emergency of new fibers have made clothing “easier to wear”. Improved fiber has made the formal wear at work casual wear after work, without worrying the problems that may occur to traditional formal wear fabrics such as deformation and crease. The surf clothing brand Quiksilver has manufactured the first surf suits, a combination of suits and diving suits. The suits are both suitable for dinner parties and surfing at sea.



一衣多穿 —— Quiksilver 的首款冲浪西装

Versatile clothing: Quiksilver's first surf suits

## 2. 功能纤维催生服装智能

科技的进步，使服装变得“更聪明”，智能服装是可穿戴领域里最具潜力的产品。功能纤维使服装可以根据环境变化调节颜色、温度甚至形状；有的服装织入导电纤维后可以连接电子原件，监控人体生命体征；服装也可以给手机等小电器充电；服装还能治疗如颈椎病等疾病。未来的服装甚至可能是可“打印”的，只需要用电脑连接一台特殊的打印机，就可以将电脑中设计的款式直接打印。智能服装的发展将颠覆传统的生活方式。

麻省理工学院研制的能帮助人体皮肤散热和保温的“纳豆细菌衣服”

The “natto bacteria-powered shirt” developed by MIT that can help skin cool and keep warm

## 2. Functional fibers make clothing smart

The advance in technology has made clothing “smarter”. Smart clothing is the product with the most potential among wearable products. Functional fiber clothing can change, temperature and even shape according to environmental changes. Some clothing, after woven with conductive fiber, can be connected to electronic components to monitor vital signs; some clothing can also charge cell phones and other small electrical devices; some clothing can even treat diseases such as cervical spondylosis. In future clothing may be even “printable”. It can be directly printed out based on the design in the computer through a special printer connected to computer. The development of smart clothing will overthrow the traditional lifestyle.

“3D 打印”作品：第 23 届“汉帛奖”金奖（北京服装学院梁秀栋）

“3D printed” work: the gold award winner of the 23th “Hempel Award”

(from Liang Xiudong of the Beijing Institute of Clothing Technology)

## 3. 节能环保始于纤维

环保意识的觉醒，使越来越多的设计师开始关注环保问题与循环再生。有的设计师提出“零浪费”的设计理念，通过一些设计手段，使面料的利用率趋近百分百；还有些设计师提出延长服装的生命周期，让服装更耐穿，以减少浪费。无论通过样板设计的“零浪费”或是延长服装的生命周期，都不是完全的“零浪费”。

近年纤维材料领域的快速发展，出现了大量的高品质环境友好型纤维，使服装实现了从原材料端开始的真正“零浪费”。“环境友好设计”及“环境友好纤维”将成为有社会责任感的企业和设计师重点。


知名设计师孙雪飞用循环再生材料设计的作品，曾发布于北京国际时装周

Works made of regenerated materials from renowned designer Sun Xuefei, released during China International Fashion Week in Beijing

## 3. Energy conservation and environmental protection starts in fiber

The awakening of environmental protection awareness has urged more and more designers to pay attention to environmental protection and recycling and regeneration. Some designers have brought up the design idea of “zero waste” to improve the utilization ratio of fabrics to nearly one hundred through some design measures; some designers have proposed extending the life cycle of clothing and making it more durable so as to reduce waste. Neither “zero waste” realized through pattern design nor the extension of the life cycles of clothing is completely “zero waste”.

In the rapid development of the fiber materials filed in recent years, a lot of quality, environmentally-friendly fibers have emerged, which have truly realized “zero waste” in the source materials of clothing. “Environmentally-friendly design” and “environmentally-friendly fibers” will become the key points of enterprises and designers with a sense of social responsibility.

## 4. 产业链定制是趋势

时尚设计的趋势是“多品种，小批量”，无论是传统服装企业还是新兴品牌不得不面对消费者对于“个性化”的需求。与消费者分享创意是未来服装设计的方向，实现从纤维、纱线、面料到时尚产品的“全产业链定制”是大势所趋。

例如运动品牌 Nike 现已可以提供多数鞋款的个性化定制，客户可以选择不同的拼接色彩、材质，还能增加个性签名。很多知名国际品牌如 Burberry、Puma 都曾不约而同的尝试邀请消费者参与设计独一无二的个性产品。

纤维是服装的基础。通过纤维性能的提升、新型功能纤维的研发，服装设计将带给人类的不仅仅是安全感与舒适性，更多的是对现代生活的态度。设计师通过对纤维的时尚演绎，将对生活的感悟融入设计，用服装改变生活。




NIKE 网站提供的运动鞋定制服务

The custom service of sports shoes on the website of Nike

—— 北京服装学院，邵新艳

## 4. Industrial chain customization is the trend

The fashion design trend is “diversity and small batch”. Both traditional clothing companies and emerging brands have to face the “personalized” demands of consumers. Sharing creative ideas with consumers will the direction in future fashion design and the “whole industrial chain customization” from fiber, yarn, fabric to fashion products represents the general trend.

For example, the sportswear brand Nike now provides custom-made design for most of its shoes. Customers can choose different splicing colors and materials and can even add signatures on their shoes. Many renowned international brands such as Burberry and Puma once invited consumers to participate in the design of their unique personalized products.

Fiber is the basis of clothing. Through the improvement of the properties of fibers and the research and development of new fibers, fashion design will provide humans with not only safety and comfort but more importantly attitudes toward modern life. Through the fashion interpretation of fibers, designers infuse their thoughts and feelings about life to their design and change life through clothing.

—— Shao Xinyan, Beijing Institute of Clothing Technology

# 牛仔趋势

牛仔预测流行趋势关键词: 弹性、耐磨、透气、柔软、轻薄。
有着近 200 年历史的牛仔面料，本季依然是占据时尚舞台。 年轻，有型，适合与其他面料的 mix &match，使牛仔一直充当时尚宠儿。从工人的工服到年轻叛逆颠覆的标志，再到出席高级场合的礼服，这一普通的面料在设计师手下变成了与时俱进的时髦。2016 对于牛仔来讲，又从哪些方面创新呢，哪些新的趋势呢

## 1. 功能性牛仔

Athleisure（运动休闲服饰） 的趋势已从欧美席卷到了全世界，紧身裤运动鞋变成了日常出街服饰。无疑，这威胁到了牛仔在休闲服饰中的主导地位。 Nike CEO Mark Parker 甚至宣布 “紧身裤是新的牛仔”。牛仔面临的危机在新产品的不断开发中巧妙化解。制造商们把消费者越来越强调的舒适性作为研发重心，将功能性纤维融入到传统的丹宁织物中，起到紫外线防护、防水和吸湿的作用，这就出现了超弹性牛仔，针织牛仔，紧身裤型吸汗牛仔等产品，从而迎合 Athleisure 这一大趋势。

除了超弹性，高强度纤维也被运用到牛仔中， 例如 Dyneem，从而增加极限运动牛仔服装的耐磨性，与此同时，牛仔面料也在变得越来越轻，满足了消费者运动方面的需求。

而牛仔在与不同纤维混纺中，也呈现出越来越多的效果。与色丁混纺创造出精细平滑的精致的面料，例如拉绒毯状厚重面料，上等初纺线和高度光泽感塔夫绸牛仔等。

与天丝，莫代尔，麻，人造丝混纺等混纺出高级丹宁面料从而用于高级成衣、定制等。而与多臂提花和提花梭织形成新的设计图案并通过水洗达到多种变化效果使丹宁变得更加丰富有趣。



# TREND OF DENIM

Denim fabric, with a history of nearly 200 years, still occupies a place in the fashion arena in this season. The fresh and stylish feature and the ability to mix & match other fabrics make denim the darling of fashion. Denim, a common kind of fabric, evolves from worker's labor clothes to the sign of youth and rebel and to dresses for senior occasions. In 2016, in what aspects will denim be innovated, and what new trends will there be?

## 1. Functional denim

Popularity of athleisure (sports apparel) has swept from European countries and the US to the whole world, and leggings and sneakers have become daily street clothing. Undoubtedly, this poses threat to the dominance of denim clothing in casual wear. Nike CEO Mark Parker even declared that "leggings are new denim wear". But the crises faced by denim were cleverly resolved in the continuous development of new products. Manufacturers put the center of R&D on the comfort which attracted increasing attention from consumers, and integrated functional fibers into traditional denim fabric for UV protection, waterproof and moisture absorption functions to be played, thus there emerged super-elastic denim, knitwear denim, and sweat-absorption denim leggings, so as to cater to the trend of Athleisure.

In addition to super-elasticity, high-strength fibers are also applied into denim, such as Dyneem, so as to increase wear-resistance of denim wear for extreme sports. Meanwhile, denim fabric is getting lighter and lighter to meet the demands of consumers for sports.

In the meantime, the blending of denim with different fabrics shows more and more different effects. And blending with satin creates smooth and fine fabrics, such as raised carpet-like heavy fabrics, fine primary-spun threads and high-gloss taffeta denim.

And the blended fabrics of denim with tencel, modal, linen, rayon and others are mainly used for high-end garment and tailor made wears. And tatting with dobby and jacquard weave form new designs, which, after water washing, can achieve a variety of effects and changes making tannins diversified and interesting.

The fabric supplier Cone also released a series of wool tannin or classic Chanel-style pile-loop fancy yarn, mixing acrylic and cotton together to create furry effect.

By survey, denim fibers-high-wire memory (composite of PTT and PET), high-performance polyurethane fiber and hydrophilic easy-dyeing cotton-like polyester fiber obtained the highest rating in the field of denim.

面料商 Cone 还推出一系列羊毛丹宁或经典香奈儿式毛圈花式纱线，将腈纶和棉混搭在一起，营造出毛茸的效果。

调查显示，牛仔用纤维—记忆高弹丝（PTT与 PET 复合）、高性能聚氨酯纤维和亲水易染仿棉聚酯纤维在牛仔领域获得评价最高。

## 2. 可持续发展牛仔

从生态水洗到棉花替代品和公平贸易活动，生态环保特征依然是公众关注的重点。现代、环保的染色方法，应用激光和臭氧技术作后整理在逐渐普及。

在 2016-2017 秋冬西班牙第一视觉 (Première Vision) 牛仔面料展上，牛仔厂商 Orta Anadolu 就与化工产品公司 Garmon Chemicals 联合举办了一场研讨会，讨论 GreenScreen® 这项新型环保工艺－证明无有害化学物质。这是经过绿色和平组织 (Greenpeace) 认证的技术。

VeganDenim，是土耳其公司 Orta 的另外一个针对可持续发展的新技术开发。他们将用蔬菜和天然染料组成的牛仔面料进行了工业规模的生产。技术公司 Jeanologia 也展示了其最新研发出的激光技术 Blue Technology，这项技术可以仿造出传统水洗效果，但不需要消耗水且节省时间。另外 Calik 的 Oxygen 技术，将 100% 纯棉用特殊的染料染色，可以加快染色时间，并且降低化学产品，水和能源的消耗。 Royo 的 Amib-Wash 技术也值得业内借鉴。

丽雅蓝™，是宜宾丝丽雅股份有限公司以高强低伸纤维素纤维—雅赛尔™为原料，采用专用环保型染料，制备牛仔用再生纤维素纱线—丽雅蓝™。丽雅蓝™ 具有超高的色牢度与舒适亲肤的触感，并且降低了水和能源的消耗，适用于各种纺纱方式，是童装、商务牛仔的优选。




## 2. Denim with sustainable development

Eco-friendly feature is still the focus of public attention through the evolution from ecological water washing to cotton alternative and fair trade. Modern and environmental-friendly dyeing method and laser and ozone technology applications are becoming more and more common.

In the 2016-2017 autumn and winter Spanish First Visual (Première Vision) denim fabric exhibition, denim manufacturer Orta Anadolu and Garmon Chemicals Company jointly held a seminar to discuss and identify that the new environmental-friendly technology of GreenScreen® contained no harmful chemicals. This is a technology certified by Greenpeace Organization.

Vegan Denim was another new technology directed to sustainable development by Turkey's Orta Company. They carried out an industrial scale of production of denim fabric combining vegetables and natural dyes. Jeanologia, a technology company, also demonstrated its latest research and development result of laser technology: Blue Technology, which can create conventional water-washing effect but does not consume water or too much time. Besides, by Calik's oxygen technology, 100% cotton can be dyed with special dyes that can shorten dyeing time and reduce chemical, water and energy consumption. Royo's Amib-Wash technology is also worth learning for the industry peers.

Liya Blue ™, is produced by Yibin Siliya Co. with Yasai'er as raw material, a high strength and low elongation cellulose fiber, using dedicated environmental-friendly dyes and regenerated cellulose yarn for preparation of denim. Liya Blue ™ boasts of ultra-high color fastness and comfortable skin-friendly feel, and helps reduce water and energy consumption. Suitable to a variety of spinning ways, it is a quality choice for children's clothing and business denim wear.

### 3. 牛仔服饰趋势

而在成衣方面，人手工纺和手工制作，原始毛边，复古喇叭腿，牛仔印花，刺绣拼接等成为这一季的关键词。

越来越注重个性化的消费者们，通过频繁使用拼缀、切割和重新上色等装饰手段和细节打造装饰性细节和个性化工艺。多层叠加的手工修补使得过时的直筒和锥形牛仔裤焕发出全新生机；将不同的牛仔裤拼缀为一条；或是通过创新的手法移除已有的拼缀，制造出充满趣味的色调变化。

本季最值得关注的就是对牛仔裤、裙裤和短裤进行裁剪，露出原始毛边成为时尚达人们凸显个性与众不同的细节之一。裸露的原始边缘使得着装看上去更加休闲，也吸更加引人的眼求。

在牛仔上玩激光印花，是香奈儿 16 春夏秀场上卡尔又一创新。这将做旧牛仔的美感发挥到了极致，令人过目难忘。同样的还有 Versus Versace，反差鲜明的印花更显活力。

复刻继续，充满乐趣的复古牛仔造型成为当前最具商业性的趋势之一。重点是 90 年代滑板牛仔情怀。阔腿牛仔裤席卷而来，与此同时，背带牛仔，复古牛仔长裙子都是时尚达人不可缺少的单品。

Assembly New York, Saint Laurent

Assembly New York, Saint Laurent

### 3. Trend of denim clothes

In terms of clothing, hand-spun and hand-made, original flash, retro horn legs, denim printing and embroidery stitching become this season's keywords.

For consumers with increasing attention to personalization, decorative details and personalization process are realized by frequent use of patchwork, cutting and re-coloring and other decorative means. Piled patches of manual repair make the outdated straight and tapered jeans full of new life; different jeans are made into one with patchwork, or the existing patchwork is removed through innovative techniques to create interesting changes of tones.

The most noteworthy in the season is that cutting for raw edges to be exposed for jeans, cropped culottes and shorts becomes one of the details for snappy dressers to highlight the distinctive personalities. With the exposed raw edges, the wear looks more casual and also attracts more eyes.

Laser printing on denim is another creation of Chanel 16 in spring and summer show arena. This brings the beauty of the old denim to an extreme and memorable extent. Versus Versace has the similar case, whose prints in sharp contrast look more dynamic.

As restoring to the ancients continues, retro denim with fun becomes one of the most commercial trends currently. The focus is the skateboard denim feelings in 1990s. With wide leg jeans sweeping, at the same time, strap denim and retro denim long skirt are indispensable single product for snappy dressers.

牛仔一直给人的印象就是休闲、街头， 而精致的刺绣牛仔给予牛仔更多女性化元素，多了一丝性感。使其更加满足消费者的需求－合身、好看、适合出席场合。

在颜色方面，靛青，牛仔最基本的颜色，继续成为本季主导颜色。

由此看来，牛仔这股潮流还会继续，而制造商也应该不断开发完善新的技术满足消费者的需求，以及迎合绿色丹宁的这一整体需要。

—— 北京洛桦资本行业观察员－茜茜

Alexander Mcqueen

Denim has always been giving the casual and street impression, while exquisite embroidery denim adds more feminine and sexy elements, so it satisfies to a larger extent the consumer demands: to be fit, good-looking and suitable to attending the occasions.

In colors, the basic color of denim indigo-blue continues to be the dominant color in this season.

Chloé, Marc Jacobs

According to the above, the denim trend will continue, and manufacturers should continue to develop new technologies and improve them to meet the needs of consumers, and to cater to the overall need of green tannin.

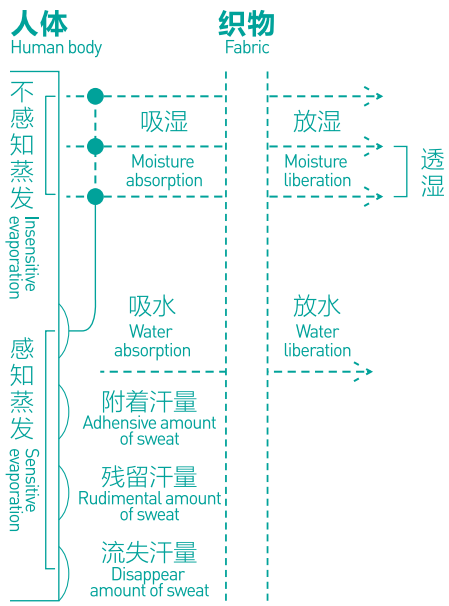
—— Xixi, Beijing Lowa Capital

# 运动材料功能的创新诉求

运动生活，对服装提出了更高的要求，除了穿着舒适外，需要附加更多的功能性，使运动中人体保持最佳状态，以提高运动的表现。其中对于材料方面的诉求可概括为以下几方面：

一个微气候：谈到功能我们必须先有微气候这个概念，即人体与衣服之间的空间，形成了一个相对稳定的环境，也有称为微循环，如下图所示。保持这个空间的气候的适宜，人体始终感觉不太冷也不太热，运动才会无束缚，才会有更好的表现。

两度管理：为了达到微气候的舒适，需管理好两个指标，即温度、湿度。保持好这个小空间的温、湿度在一个合理的范围是我们的目标，保持微循环温、湿度的能力也是我们考量一个功能材料优劣的最直观的标准。为了更有效的去控制温、湿度，我们会根据人体生理发汗区域分布特征（如下图）来有针对性的解决两度问题。

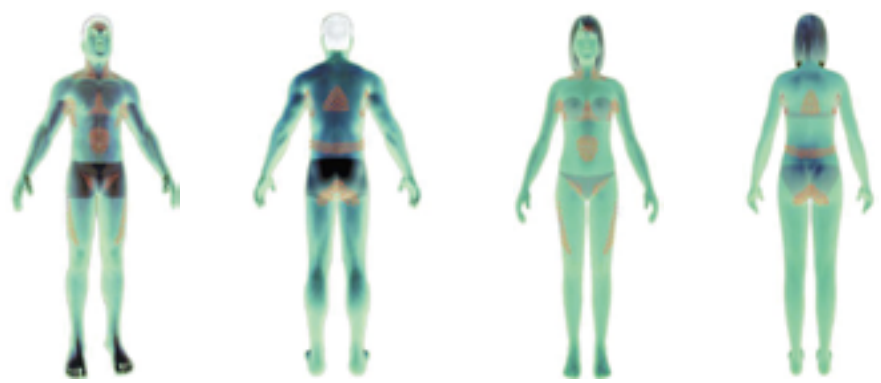



# THE CREATIVE DEMANDS OF FUNCTIONS OF SPORTS MATERIALS

Sports life puts forward higher requirements for clothing. In addition to comfort, sports clothing need to be attached with more functionality, so that the body can be maintained with the best state in movement, so as to improve the performance of the movement. Wherein, the demands on materials can be summarized as the following aspects:

A micro-climate: speaking of the functions, we must mention the concept of micro-climate, i.e. in the space between the body and clothes there forms a relatively stable environment, also known as micro-circulation, as shown below. When a comfortable climate of the space is kept, the body always feels neither too hot nor too cold, so that sports will see no bound and better performance.

Two-Degree Management: in order to achieve a comfortable micro-climate, two indicators need to be soundly managed, namely temperature and humidity. Keeping the temperature and humidity in this small space within a reasonable range is our goal, and the ability to keep stable temperature and humidity in microcirculation is the most intuitive standard for us to consider the merits of a functional material. In order to control the temperature and humidity more effectively, we will draw reference from the location characteristics of human physiological sweat areas (as shown below) to solve the targeted problems related to temperature and humidity.

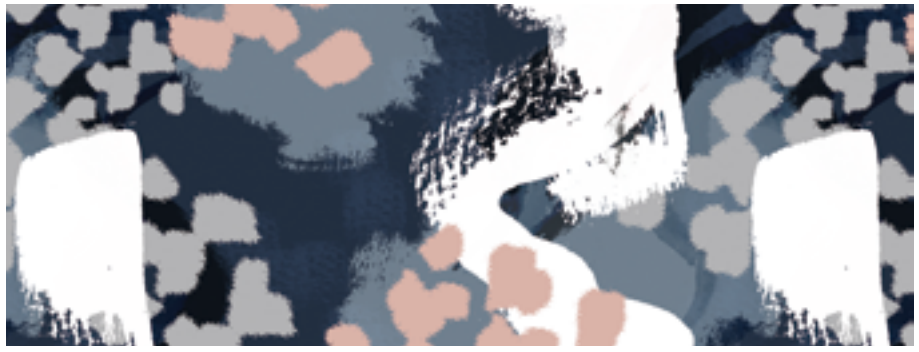


三个维度: 材料的创新应从三个不同的维度出发。首先考虑的是功能方面，吸湿排汗、防水透湿、抗菌防臭等来改善面料的穿着舒适; 其次是客户体验，功能并非停留在标准上，最终需要消费者认可、认同，愿意为功能买单; 最后是环保安全，随着人们生活水平的日益提高，纺织品安全越来越受到重视，近几年对 PFOA、PFOS 等化学品的关注就是一个很好的例子。

四个更加: 运动有着不同的种类及项目，随着分工的细化，消费习惯的变化及专业功能的诉求。如: 篮球装备需要有超强的吸排功能，网球装备要求有较强的防晒功能。要求材料功能更加专业化，市场更加精细化，功能更加独特化，生活质量更加健康化。

五个关键词: 可视、升级 & 评估、体验、智能、环保。智能穿戴作为未来的趋势，很多品牌、机构投了大量的人力物力，对前景充分看好。对环保也有更多的理解，并非聚酯瓶回收纺丝，低浴比染色等节能减排等意义上的环保，对化纤的最终解决方案应该是象天然纤维一样能降解才是目标，特别是使用最多的聚酯纤维的降解改性是我们关注的一个方向。

总而言之，材料的功能是为运动需求服务，为创造更好的穿着体验。促进运动表现的提高。



吴安福，李宁（中国）体育用品有限公司

Three dimensions: innovation of materials should be started in three different dimensions. The first dimension is functionality. Such functions of hygroscopic and sweat releasing, waterproof and breathability, and antibacterial deodorization can help add comfort of fabrics; followed by customer experience: functions are not only to be met in standards, but eventually need to be recognized and identified by consumers, and they will be willing to pay for functions; the final is environmental safety: as people's living standards increase, more and more attention are given to textile safety, and the attention in recent years on PFOA, PFOS and other chemicals is a good example.

Four improvements: there will be different types and projects of sports following the refinement of division, changes in consumption habits and emerging demands in professional functions. For instance: basketball equipment needs powerful suction and releasing function, tennis equipment requires strong sunscreen function. The material functions are required to be more specialized, market more refined, functions unique and quality of life healthier.

Five key words: visual, upgrade & assessment, experience, intelligence, and environmental protection. Many brands and institutions invested a lot of manpower and material resources into smart dress, the future trend, and held fully optimistic prospects. More understandings come out with environmental protection, rather than energy-saving and exhaustion-reducing aspects like PET bottle recycling spinning, low liquor ratio dyeing. The ultimate solution for fiber should be to find the ability of degradation as natural fiber, and especially, degraded modification of polyester fiber that is used most is a direction of our attention.

All in all, the functions of materials are to serve sports demands, create better wearing experience, and promote the improvement of athletic performance.

Wu Anfu, Li Ning (China) Sports Goods Co., Ltd.

# 户外服装功能性材料实际需求及应用趋势

近几年，随着人们安全防护、健康生活的需求，户外服装产业蓬勃发展，无论是体验式旅行还是专业户外的细分和聚焦，户外服装受到越来越多现代人的关注和推崇。户外服装区别于普通服饰及运动服装，最大的特点在于其材料功能性和服装功能性。从以下几方面，分析户外功能性服装材料的实际需求及应用趋势。

## 1. 材料的差别化和功能性分类

户外服装最早源于军工和防护性服装，材料的差别化及功能性划分为三大类：

**耐** 耐久性，耐用性，如何水洗、耐汗渍，耐光，耐磨，耐寒，耐黄变，耐撕裂

**防** 防护性，如：防水，防风，防油污，防晒，防滑，防震，防穿刺

**其他功能** 保温，透气，吸湿速干，轻量，单向导湿，储能蓄热，凉感，弹力，荧光，抑菌，防蚊虫

（1）耐久性、耐用性：户外材料使用时需经受环境和时间的考验，其基本物性上要高于普通服饰，如耐光色牢度、耐汗渍、耐黄变的要求，材料本身的拉伸、耐磨及抗撕裂性能的要求。

（2）防护性：防护性直接关系到产品使用中安全保护，对于户外功能性材料要求具有一定的防护性，如防水透湿，防风，防晒，防油污等。

（3）舒适性：结合户外环境及运动强度，户外材料比普通运动材料更强调舒适性，如吸湿速干、抑菌、轻量、仿棉感，弹性回复性，中空保暖，蓄热发热，防蚊虫等。



# THE ACTUAL NEEDS AND APPLICATION TRENDS OF FUNCTIONAL MATERIALS OF OUTDOOR CLOTHING

In recent years, with increasing demands on safety and healthy living, the outdoor clothing industry is flourishing. Whether it is travel or professional outdoor segmentation, outdoor clothing gains more and more attention and favor from modern people. Unlike the ordinary clothing and sportswear, the biggest feature of outdoor clothing is its functionality of materials and functionality of wear. Around the following aspects, an analysis of the actual needs and application trends of outdoor functional clothing materials is made.

## 1. Material differentiation and functional classification

Outdoor clothing originated from the military and protective clothing. The material differentiation and functional classification are shown in the following three categories:

(1) Durability: use of materials for outdoor clothing is to stand the test of environment and time, whose basic physical properties are stronger than those of ordinary clothing, such as light-resistant color fastness, perspiration-resistant, anti-yellowing, and the stretching, wear-resistance and tear-resistance requirements of materials.

(2) Protective: protective property is directly related to security and protection in the use, so the outdoor functional materials are required to be with a certain degree of protection, such as waterproof and moisture permeability, windproof, sunscreen, anti-oil and the like.

(3) Comfort: combining outdoor environment and intensity of sports, more emphasis on comfort is drawn on outdoor materials than ordinary sports materials, such as moisture absorption and quick dry, anti-bacterial, lightweight, cotton-like feelings, elasticity recovery, hollow warmth, heat preservation and regeneration, anti-mosquito, etc.

## 2. 极简产品，打造极致功能

一件好的户外服装，要精简外表冗余，提升细节工艺，如防水胶条匹配度，表面防泼水工艺与胶膜匹配度，切割、冲孔、压胶工艺的精度和牢度，弹性材料及弹力纤维的应用等。

## 3. 防水、透湿是户外材料的永恒主题

防水性：表面拒水性未来着眼于开发拒水涤纶或锦纶纤维和环保无氟防水助剂。无论是纤维还是助剂，要求在染色、后整理、多次洗涤后要保持防泼水的耐久性。

透湿性：在冲锋衣、软壳、皮肤衣等梭织材料和 T 恤针织材料上，要直接反应服用舒适度。纤维特性及织物结构在未来还有开发的空间。

## 4. 材料功能要落在实际体验，指标过剩无益

功能性纺织材料琳琅满目，从检测表征上，存在部分功能无法表征或测试结果与实际体验不完全一致。例如有些材料耐水压测到 10000–20000mmH2O 的高数值，但是薄膜或涂层的亲水性造成实际淋雨超过 30min，面料内侧湿度开始增加，长时间雨淋穿着有潮湿感。又如，一些吸光发热或红外发热材料，测试时略有数据支持，但是实际穿着或阴暗天气时并无特别突出的感受。功能性宣传概念大于实际效果。

## 5. 环保材料

纤维、助剂、生产环保等诸多方面，例如母粒染色、防蚊虫、无氟助剂等，在于真正的解决环保及使用安全问题。从消费者角度要更加注意材料安全性和性价比；从纺织产业链上，要积极解决生产环节的环保问题，品牌方积极配合选择在生产环节中采用环保技术的纺织品。

## 6. 纤维应用趋势

户外产品在日常穿着时，要兼顾手感和外观，从纤维趋势上看，无论是梭织还是针织，仿棉感、弹性、环保纤维都会受到欢迎。例如：1）超仿棉纤维和收缩丝，织造出的面料在外观上毛羽丰富、性能优越；2）双组份纤维在织物的色彩和回复性上有较好表现；3）环保纤维的健康，安全性被消费者接受。

—— 蔡智怡，探路者控股集团股份有限公司

## 2. Simple products with perfect functions

Good outdoor clothing should avoid redundancy in appearance and enhance details of the process, such as matching degree of waterproof tape, surface waterproof technology and film matching degree, fineness and fastness of cutting, punching and adhesive technology, and application of elastic materials and elastic fibers, etc.

## 3. Waterproof and moisture permeability: the eternal theme of outdoor materials

Waterproof: in the future, as to surface waterproof property, water-repellent nylon or polyester fiber and CFC-free waterproofing additives is the focus of development. Whether it is fiber or additive, it is required that waterproof durability is maintained after dyeing, finishing and washing of several times.

Moisture permeability: in the woven materials and knitted T-shirt materials of the jacket, soft shell, skin clothing and the like, the degree of comfort is directly shown. Fiber properties and fabric structure have the potential of development in the future.

## 4. Material functions should be actually experienced, excess indicators are useless

Functional textile materials are dazzling. Seen from the performance of testing, some functions cannot be presented or the test results are not the same with actual experience. For example, some materials are measured with a waterproof pressure as high as 10000-20000 mm H2O, but the hydrophilic feature of film or coating causes actual wetting of more than 30 min, so humidity inside the fabric begins to increase, and that is why long-time wearing brings wet feelings. In another example, for some light absorbing or infrared heating materials, there is some data for support in testing, but in dark days, the actual wearer has not the particular feelings. Functional promotion concepts always outweigh the actual effect.

## 5. Environmental-friendly materials

As to the materials of fibers, additives and environmental protection in production, such as dyeing of master batch, anti-mosquito, CFC-free additives and etc., the key lies in real solution of issues related to environmental protection and safety uses. From the point of view of consumers, more attention should be paid to safety of material and performance-cost ratio; as to the textile industry chain, problems related to environmental protection in production processes should be actively solved, and the brand maker should actively cooperate manufactures to choose textiles involving environmental-friendly technology in the production processes.

## 6. Application trend of fibers

For everyday wear, outdoor products should take both into account of feel and appearance. As to the fiber trend, either woven or knitted, cotton-like, elastic and environmental-friendly fibers will be popular. For example: 1) fabrics woven by super cotton-like fiber and shrinkage yarn have furry appearance and superior performance; 2) fabrics of two-component fibers have good performance in colors and resilience; 3) green fibers are welcomed by consumers for health and security.

—— Cai Zhiyi, Toread Holdings Co., Ltd.

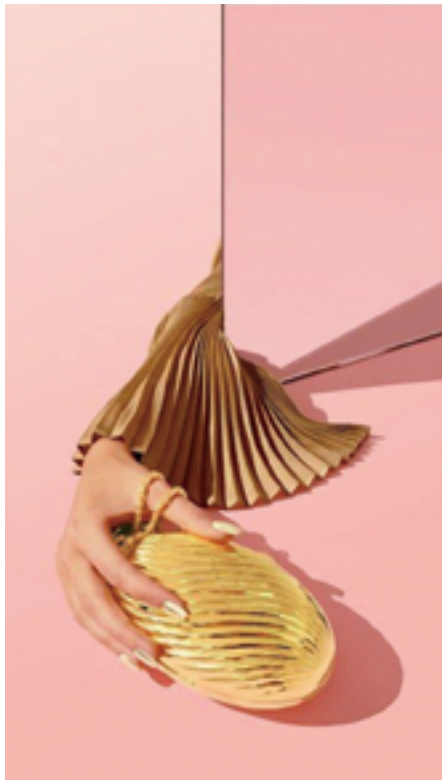
# 弹指五年，精彩重现
# REVIEW OF PREVIOUS SPLENDIDNESS

时光回溯到 2012 年，“中国纤维流行趋势” 在北京迈出了引领行业转型升级、共建品牌辉煌的第一步。五年来，“中国纤维流行趋势” 不忘初心，以强大的中国化纤产业为依托，坚持创新驱动、时尚引领、绿色发展，带动纺织产业链 “提品质、增品种、创品牌”，以创新激活新的消费需求，提升产业链整体竞争能力。

“中国纤维流行趋势” 的战略研究，不仅开创了原料端趋势研究的先河，更符合国家 “供给侧” 改革思路，成为新时期 “三品” 战略中引导行业品牌建设及新品开发的重要内容。

Dating back to 2012, “Trends of Fiber China” took the first step towards industry restructuring and updating, and thus establishing the brand glory with joint efforts. In the past 5 years, adhering to the initial determination, based on mighty chemical fiber industry in China, “Trends of Fiber China” has been driven by innovation, led by fashion and developed by green concepts, bringing along the textile industry to improve quality, to expand range and to establish brand, motivating new consumption needs by innovation, and promoting the comprehensive competitive capacity of the industry chain.

The strategic study of “Trends of Fiber China” not only creates a new road for the trend study from material end, but also complies with the nation’s reform thinking of “supply side”, becoming the significant content of leading industry brand-building and new product development in the “Three Brand” strategy in this new stage.



**通过五年的探索与创新，“中国纤维流行趋势”逐渐形成了具有中国特色的纤维品牌建设推进体系，完成以下工作：**

(1)建立了纤维流行的概念及特征研究方法

(2)研究宏观环境对纤维流行趋势的影响因素

(3)完善中国纤维流行趋势评价体系

(4)建立纤维流行趋势发布运行机制

(5)丰富了纤维流行趋势推广模式

“中国纤维流行趋势”致力于将中国最优秀的化纤产品推荐给产业链下游，在推进产业链协同创新、技术进步、品牌建设、提升社会责任使命的同时，更大力倡导和谐的生活方式和绿色可持续的消费理念。

**By 5-year discovery and innovation, “Trends of Fiber China” gradually forms a promoting system of fiber brand building with Chinese characteristics by completing the tasks as listed below:**

(1) Establishment of the fiber trend concept and characteristic study method;

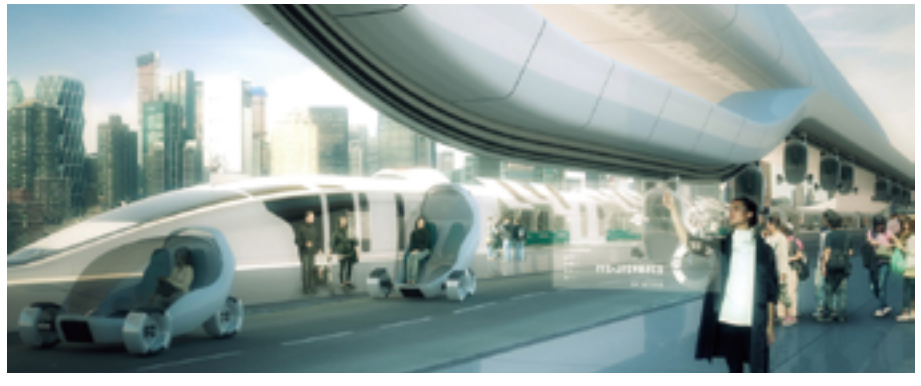
(2) Research of the influence factors of macro-environment on fiber trend;

(3) Perfection of the evaluation system of fiber trend in China;

(4) Establishment of the publication and operation system of fiber trend;

(5) Enrichment of the promotion pattern of fiber trend.

“Fiber Trend China” is committed to recommending the best chemical fiber in China to the downstream of the industry chain, and to more extensively promote harmonious lifestyle and green sustainable consumption concept as well as to propel the industry chain with innovation, technological progress, brand-building and social responsibility.



# 一 . 发布主题与内容回顾

### 1. 中国纤维流行趋势 2012 / 2013

围绕“生态、时尚、功能、环保、科技”主题，发布十个纤维产品：异形细旦吸湿排汗聚酯纤维、异收缩复合聚酯纤维、PTT/ PBT 聚酯纤维、阻燃粘胶纤维、全消光超细旦聚酰胺 6 纤维、原液着色聚酯纤维、再生聚酯纤维、聚苯硫醚纤维、竹浆纤维和壳聚糖纤维。

### 2. 中国纤维流行趋势 2013 / 2014

响应“十八大”提出的“推进绿色发展、循环发展、低碳发展”、“建设美丽中国”的精神，以“绿色、循环、低碳”为主题，发布十大纤维品种：循环再生纤维，生物基纤维，无染纤维，易染、深染纤维，凉感纤维，保暖纤维舒感纤维，防透视纤维，轻质化纤维和安全防护纤维。



# 1. REVIEW ON THE THEME AND CONTENT RELEASED

### 1. Fiber Trends in China 2012 / 2013

Under the theme of “Ecology, Fashion, Function, Environmental-friendliness, Technology”, ten fiber products were released: profiled fine denier wicking polyester fiber, composite polyester fiber with differential shrinkage, PTT/PBT polyester fiber, flame-retardant viscose, full dull super-fine denier polyamide 6 fiber, liquid-colored polyester fiber, recycled polyester fiber, PPS fiber, bamboo pulp fiber and chitosan fiber.

### 2. Fiber Trends in China 2013 / 2014

Responding to the essence of “promoting green, cyclic and low-carbon development” and “constructing beautiful China” put forward by the 18th five-yearly Congress, “green, cycle, and low carbon” as the theme, the ten main fibers were released: recycled fiber, bio-based fiber, dye-free fiber, easily-dyed and deep-dyed fiber, cool fiber, thermal fiber, comfortable fiber, anti-transparency fiber, lightweight fiber and safety-protecting fiber.

### 3. Fiber Trends in China 2014 / 2015

“Harmony and Quality” as the theme, the four chapters of “Shield of Fiber – Health Protection”, “Rhyme of Fiber – Exquisite Life”, “Source of Fiber – Green and Low Carbon” and “Charm of Fiber – Bright Colors” were brought out and the ten main fibers were released: PM2.5 industrial protection fiber, flame-retardant fiber, cotton-like fiber, wool-like fiber, thermal fiber, cool fiber, bio-based fiber, recycled fiber, dye-free fiber and easily-dyed fiber.

### 3. 中国纤维流行趋势 2014 / 2015

以“和谐与品质”为主题，推出“纤之盾——健康防护篇”、“纤之韵——精致生活篇”、“纤之源——绿色低碳篇”、“纤之魅——绚丽色彩篇”四大篇章。发布十大纤维品种：PM2.5 工业防护纤维，阻燃纤维，仿棉纤维，仿毛纤维，保暖纤维，凉感纤维，生物基纤维，循环再生纤维，无染纤维和易染纤维。

### 4. 中国纤维流行趋势 2015 / 2016

以“创新与融合”为主题，推出“纤·科技畅想”、“纤·舒馨生活”、“纤·美妙生态”、“纤·安全防御”四大篇章。发布十大纤维品种：智能纤维、生态抑菌纤维、功能保暖纤维、功能凉感纤维、仿棉纤维、弹性纤维、轻柔纤维、无染 / 易染纤维、生物基纤维、工程纤维。

### 5. 中国纤维流行趋势 2016 / 2017

功能护理纤维、功能亲肤纤维、循环再生纤维、无染纤维、生物基化学纤维、安全防护纤维、高温过滤纤维、增强工程纤维、幻彩纤维、舒感纤维。

通过中国纤维流行趋势战略研究与发布的引领，我国化纤企业加大了差异化、高附加产品开发力度，研发投入不断提高，企业平均研发投资比例从 2011 年的 2.5% 提高到 2015 年的 3.8%。在“中国纤维流行趋势”发布平台上，300 余家企业参与了申报，涵盖 500 多个纤维产品。经过严格的评审与筛选，五年来共发布 21 大类纤维品种，来自 120 家化纤企业的 180 个产品在这一平台上进行了推介和展示。支撑了 18 个化纤标准建设，注册纤维品牌 31 个，建立检测中心 16 个。



### 4. Fiber Trends in China 2015 / 2016

“Innovation and Fusion” as the theme, the four chapters of “Fiber – Technological Imagination”, “Fiber – Comfortable Life”, “Fiber – Amazing Ecology” and “Fiber – Safety Protection” were brought out and the ten main fibers were released: smart fiber, ecological anti-bacterial fiber, functional thermal fiber, functional cool fiber, cotton-like fiber, elastic fiber, lightweight and soft fiber, dye-free/easily-dyed fiber, bio-based fiber and engineering fiber.

### 5. Fiber Trends in China 2016 / 2017

“Overturning and Reshaping” as the theme, the four chapters of “Fiber – Protection”, “Fiber – Green”, “Fiber – Intelligence” and “Fiber – Grace” and ten main fibers were released: care fiber, skin-friendly fiber, recycled fiber, dye-free fiber, bio-based fiber, safety protection fiber, high-temperature screened fiber, strengthened engineering fiber, colorful fiber and comfortable fiber.



Led by the strategic study and release of the “Fiber Trends China”, chemical fiber enterprises enlarge the differentiation, intensify the development efforts of high value-added products, and increase the input for research and development, the average input for it from 2.5% in 2011 increased to 3.8% in 2015. On the release platform of “Fiber Trends in China”, more than 300 enterprises participated in the report, with a coverage of over 500 fiber products. After strict evaluation and screening, 21 main fibers have been released and 180 products from 120 chemical fiber enterprises have been on promotion and exhibition during the past five years. 18 chemical standard construction programs have been supported, 31 fiber brands have been registered and 16 testing centers have been built.

# 二 . 活动大记事

2012 年

“中国纤维流行趋势2012/2013发布会”在北京召开;

发布《中国纤维流行趋势 2012/2013 报告》。

2013 年

“中国纤维流行趋势2013/2014发布会”在北京召开;

“盛虹杯·中国纤维创意空间设计大赛”颁奖典礼在发布会上举行, 自全国 15 所高校的 106 份纤维艺术作品参加比赛;

在中国国际纱线(春夏)展览会上设立“纤维流行趋势发布区”、“盛虹杯中国纤维创意联展”、“化纤循环经济体验区”、“仿棉纤维”、“时尚锦纶”等主题展示。

发布《中国纤维流行趋势 2013/2014 报告》;

出版《盛虹杯·中国纤维创意空间作品集》。

发布 2013/2014 中国纤维流行趋势主题展览调研报告。

# 2. ACTIVITIES

In 2012,

“Press Conference of Fiber Trends in China 2012/2013” was held in Beijing;

“Report on Fiber Trends in China 2012/2013” was issued.

In 2013,

“Press Conference of Fiber Trends in China 2013/2014” was held in Beijing;

The award ceremony of “Shenghong Cup - China Fiber Creative Space Design Competition” was held on the press conference, with 106 fiber artistic works from 15 colleges nationwide;

On the China International Exhibition on Yarn (SS), such themes as“Release Area of Fiber Trends”, “Shenghong Cup China Fiber Creative Group Exhibition”, “Experience Area of Chemical Fiber Recycled Economy”, “Cotton-like Fiber” and “Fashion Polyamide”were on show.

“Report on China Fiber Trends 2013/2014” was issued;

“Works Collection of Shenghong Cup - China Fiber Creative Space” was published.

The research report with the theme of china fiber trends 2013/2014 was issued.

2014 年

“中国纤维流行趋势2014/2015发布会”在上海召开;

与“金顶奖”设计师武学凯.武学伟先生合作,共同演绎“盛虹·中国纤维(逸绵)创意时尚汇”,奉献一场精彩的T台秀;

在中国国际纱线(春夏)展览会上匠心中打造“中国纤维馆”,设立“纤维流行趋势发布”、“逸绵”、“高性能纤维应用展”、“生物基纤维”、“再生品牌”、“粘胶长丝卫星区”等主题展区。

发布《中国纤维流行趋势 2014/2015 报告》;

出版《盛虹·中国纤维(逸绵)创意时尚汇 2014》。

发布 2014/2015 中国纤维流行趋势主题展览调研报告。

2015 年

盛虹冠名“中国纤维流行趋势发布会”

“盛虹·中国纤维流行趋势 2015/2016 发布会”在上海召开;

与设计师武学凯先生及香港理工大学合作,推出“华彩 2015—中国纤维创意时尚汇”;

进行“最佳年度合作伙伴”评选,从下游企业中评选出 30 家年度合作伙伴,并为其中 10 家最佳合作伙伴颁奖;

在中国国际纱线(春夏)展览会的“中国纤维馆”设立“纤维流行趋势发布”、“生物基纤维”、“循环再生”、“逸绵”、“特种功能性纤维”等主题展区;

“中国纤维馆”永久展馆落户盛泽,常年展出、永不落幕;

开启“中国纤维流行趋势”国际家纺展及10 月中国国际纱线(秋冬)展发布展示模式。

发布《中国纤维流行趋势 2015/2016 报告》;

发布《华彩 2015·中国纤维创意时尚汇》;

开通“中国纤维流行趋势”官方微信平台。

发布 2015/2016 中国纤维流行趋势主题展览调研报告(春夏、秋冬两季)。

随着“中国纤维流行趋势”的日趋成熟,活动越来越丰富、结合更加时尚、科技的手段进行演绎和展示,并在日常开展专业领域的对接、培训活动。

展望未来,“中国纤维流行趋势”在推动供给侧改革的征程中,开启新的起航,实现质的提升和超越。让中国纤维品牌在“中国纤维流行趋势”的大舞台上迅速成长,上演更为傲人的辉煌。


In 2014,

“Press Conference of Fiber Trends in China 2014/2015” was held in Shanghai;

In cooperation with the “China Fashion Design Golden Award”designers Xuekai Wu and Xuewei Wu, “Shenghong - China Fiber (Yimian) Creative Fashion Collection” was played with a wonderful fashion show;

On the China International Exhibition on Yarn (SS), “China Fiber Pavilion” was elaborately designed, with the exhibition areas for the themes of “Release of Fiber Trends”, “Yimian”, “Application Exhibition of High-performance Fiber”, “Bio-based Fiber”, “Recycled Brand” and “Satellite Area of Viscose Filament Yarn”.

“Report on China Fiber Trends 2014/2015” was issued;

“Works Collection of Shenghong Cup - China Fiber (Yimian) Creative Space 2014” was published.

The research report with the theme of china fiber trends 2014/2015 was issued.

In 2015,

Shenghong named the “Press Conference of Fiber Trends in China”;

“Shenghong - Press Conference of Fiber Trends in China 2015/2016” was held in Shanghai;

In cooperation with the designer Xuekai Wu and theHongKongPolytechnicUniversity, “China Color 2015 - China Fiber Creative Fashion Collection” was brought out;

The voting of “Best Partner of the Year” selected 30 cooperative partners of the year from the downstream enterprises and awarded for the top 10 of them;

On the China International Exhibition on Yarns (SS), “China Fiber Pavilion” was with the exhibition areas for the themes of “Release of Fiber Trends”, “Bio-based Fiber”, “Recycled Brand”, “Yimian” and “special functional fiber”.

The permanent exhibition pavilion of the “China Fiber Pavilion” was settled in Shengze, with permanent exhibition throughout the year;

The exhibition pattern of “China Fiber Trends” International Home Textiles Exhibition and the China International Exhibition on Yarns (AW) in October was started.

“Report on China Fiber Trends 2015/2016” was issued;

“Works Collection of China Color 2015- China Fiber Creative Space” was issued;

The official WeChat platform for “China Fiber Trends” was opened.

The research report for both SS and AW with the theme of china fiber trends 2015/2016 was issued.


As “China Fiber Trends” gradually progresses into maturity, the colorful activities are played and showed in combination with more fashionable and technological means. In the meantime, paring and training activities of professional fields are carried out in daily life.

Looking forward to the future, in the promotion of supply side reform, “China Fiber Trends” opens a new page by the upgrading and surmounting of quality, and provide the fiber brands in China with a huge stage for fast growth and brilliant glory.

# 中国纤维流行趋势代表企业及产品品牌表 2016 / 2017

| | 产品名称 | 企业名称 | 品牌 |
|---|---|---|---|
| **纤·呵护** | | | |
| 功能护理纤维 | 卫材级双组份复合纤维 | 江苏江南高纤股份有限公司 | 牛头牌 |
| | 卫材级聚乳酸复合纤维 | 恒天长江生物材料有限公司 | 恒天·聚乳酸 |
| | 卫材级再生纤维素复合纤维 | 青岛郎特纤维有限公司 | 天茶 |
| 功能亲肤纤维 | 生物质石墨烯内暖再生纤维素纤维 | 济南圣泉集团股份有限公司 | 圣养 |
| | 高吸湿发热聚丙烯腈纤维 | 上海正家牛奶丝科技有限公司 | 易热宝 |
| | 抑菌保暖海藻酸铜纤维 | 厦门百美特生物材料科技有限公司 | 爱其酷 |
| **纤·绿色** | | | |
| 循环再生纤维 | 防泼水循环再生聚酯纤维 | 浙江佳人新材料有限公司 | ECO CIRCLE |
| | 低熔点循环再生聚酯复合纤维 | 宁波大发化纤有限公司 | 大发 |
| | 多功能循环再生聚酯纤维 | 浙江绿宇环保有限公司 | 绿宇 |
| | 多功能循环再生聚酯纤维 | 上海德福伦化纤有限公司 | 德福伦 |
| | 有色循环再生聚酯纤维 | 优彩环保资源科技股份有限公司 | 江河 |
| 无染纤维 | 无染聚酰胺6纤维 | 广东新会美达锦纶股份有限公司 | 达丽纶 |
| | 无染聚酯纤维 | 江苏霞客环保色纺股份有限公司 | 霞客 |
| | 无染异形聚酯单丝 | 浙江金霞新材料科技有限公司 | 金霞 |
| 生物基化学纤维 | 速效抑菌止血壳聚糖纤维 | 海斯摩尔生物科技有限公司 | 海斯摩尔 |
| | 莫赛尔纤维 | 山东岚利实业有限公司 | 璞赛尔 |
| | 莫赛尔纤维 | 保定天鹅新型纤维制造有限公司 | 元丝 |
| **纤·智汇** | | | |
| 安全防护纤维 | 超高分子量聚乙烯纤维 | 中国石化仪征化纤有限责任公司 | 力纶 |
| | 高强型对位芳纶纤维 | 烟台泰和新材料股份有限公司 | 泰普龙 |
| | 阻燃隔热玄武岩纤维 | 浙江石金玄武岩纤维有限公司 | 石金 |
| | 有色聚酰亚胺纤维 | 江苏奥神新材料股份有限公司 | 甲纶 |
| | 导电聚酰胺6单丝 | 江苏中杰澳新材料有限公司 | 中杰澳 |
| 高温过滤纤维 | 纳米改性聚苯硫醚纤维 | 苏州金泉新材料股份有限公司 | 艾部 |
| | 细旦聚酰亚胺纤维 | 长春高琦聚酰亚胺材料有限公司 | 软纶 |
| 增强工程纤维 | 亲水增强聚酯工程纤维 | 浙江古纤道新材料股份有限公司 | 古纤道 |
| **纤·安全防御** | | | |
| 幻彩纤维 | 阳离子低温可染聚酯纤维 | 江苏盛虹科技股份有限公司 | 异彩纱 |
| | 深染聚酰胺6纤维 | 福建凯邦锦纶科技有限公司 | 凯邦 |
| | 牛仔用再生纤维素纤维 | 宜宾丝丽雅股份有限公司 | 丽雅蓝 |
| | 光致变色再生纤维素纤维 | 新乡化纤股份有限公司 | 白鹭 |
| 舒感纤维 | 超细旦聚丙烯纤维 | 浙江金霞新材料科技有限公司 | 金霞 |
| | 超柔超强再生纤维素纤维 | 赛得利（福建）纤维有限公司 | 赛得利 |
| | 永久高弹性聚酯纤维 | 江苏恒力化纤股份有限公司 | 恒远 |
| | 高收缩涤纶复合纤维 | 南通永盛纤维新材料有限公司 | 永盛 |
| | 仿棉轻柔聚酯纤维 | 桐昆集团股份有限公司 | 桐昆 |
| | 亲肤抑菌聚乳酸纤维 | 河南省龙都生物科技有限公司 | 御丝 |



# MAJOR BRANDS OF REPRESENTATIVE ENTERPRISES

| | Product name | Company | Brand |
|---|---|---|---|
| **Fibers Care** | | | |
| Functional Nursing Fiber | Eisai-ived two-component composite fiber | Jiangsu Jiangnan High Polymer Fiber Co. Ltd. | NANTOU |
| | Eisai-ived poly-lactic acid composite fiber | CHTC Grasjare Co., Ltd. | Hi-TECH Poly Lactic Acid |
| | Eisai-ived regenerated cellulose composite fiber | Qingdao Betterlex Fiber Co.,Ltd. | TENTEA |
| Functional Skin-Friendly Fiber | Bio-based graphene heat-generation regenerated cellulose fiber | Jinan Shengquan Group Co., Ltd. | SHUNDHDAL |
| | Highly hygroscopic heat generation poly-acrylonitrile fiber | Shanghai Zhonglia Milkfiber Sci & Tech Co.,Ltd. | E-HOT Fiber |
| | Antibacterial warm copper alginate fiber | Xiamen BioinTek Co.,Ltd. | Algicop |
| **Fibers Green** | | | |
| Regenerated Fiber | Water repellent regenerated polyester fiber | Zhejiang Jiaren New Materials Co.,Ltd. | ECO CIRCLE |
| | Low-melting-point regenerated polyester composite fiber | Ningbo Dafa Chemical Fiber Co.,Ltd. | DaFa |
| | Multifunctional regenerated polyester fiber | Zhejiang Green Universe Environmental Protection Co.,Ltd. | LvYu |
| | Multifunctional regenerated polyester fiber | Shanghai Different Chemical Fiber Co.,Ltd. | Different |
| | Regenerated polyester color fiber | Elite Color Environmental Resources Science & Technology Co.,Ltd. | JIANGHE |
| Spun-Dyed Fiber | Spun-dyed polyamide 6 fiber | Guangdong Xinhui Meida Nylon Co.,Ltd. | COLORON |
| | Spun-dyed polyester fiber | Jiangsu Xiake Color Spinning Co.,Ltd. | SEEKER |
| | Spun-dyed profiled polyester monofilament yarn | Zhejiang Jinxia New Materials Technology Co.,Ltd. | JINXIA |
| Bio-Based Chemical Fiber | Quick antibacterial and hemostatic chitosan fiber | Wamei Bio-Technology Co.,Ltd. | Hamei |
| | Lyocell fiber | Shandong Yingli Industrial Co.,Ltd. | Incell |
| | Lyocell fiber | Baoding Swan Fiber Co.,Ltd. | ORICELL |
| **Fibers Wisdom** | | | |
| Safety Protective Fiber | Ultrahigh molecular weight polyethylene fiber | Sinopec Yizheng Chemical Fiber L.L.C. | LYLON |
| | High-strength para-aramid fiber | Yantai Taiyo Advanced Materials Co.,Ltd. | Taparan |
| | Flame retardant insulating basalt fiber | Zhejiang GBF Basalt Fiber Co.,Ltd. | GBF |
| | Polyimide color fiber | Jiangsu Aosheng Hi-tech Materials Co.,Ltd. | Suplon |
| | Conductive polyamide 6 monofilament | Jiangsu ZJA New Material Co.,Ltd. | ZJA |
| High-temperature filtration fiber | Nano modified polyphenylene sulfide fiber | Suzhou Kingcharm New Materials Corp. | AN-PPS |
| | Fine denier polyimide fiber | Changchun Hipolyking Co.,Ltd. | YUJIN |
| Reinforced engineering Fiber | Hydrophilic reinforced polyester engineering fiber | Zhejiang Guxiandai Industrial Fiber Co.,Ltd. | GUXIANDAO |
| **Fibers Elegant** | | | |
| Colorful Fiber | Cationic low-temperature dyeable polyester fiber | Jiangsu Shenghong Science and Technology Co.,Ltd. | ECHASE |
| | Deeply dyed and modified polyamide 6 fiber | Fujian Kaibang Polyamide Technology Co.,Ltd. | KaiBang |
| | Regenerated cellulose fiber for jeans | Yibin Grace Group Company. | Blue Grace |
| | Photochromic regenerated cellulose fiber | Sinocamp Chemical Fiber Co.,Ltd. | Bailu |
| Comfort Fiber | Ultrafine dyeable polypropylene fiber | Zhejiang Jinxia New Materials Technology Co.,Ltd. | JINXIA |
| | Ultra-soft super-strength regenerated cellulose fiber | Sateri Group | Sateri |
| | Permanent high-elastic polyester fiber | Jiangsu Hengli Chemical Fiber Co.,Ltd. | HENGTUEN |
| | High-shrinkage polyester-nylon composite fiber | Nantong Yongsheng Advanced Materials Co., Ltd. | YONGSHENG |
| | Imitation cashmere soft polyester fiber | Tongkun Group Co., Ltd. | TONGKUN |
| | Skin-friendly anti-bacteria poly-lactic acid fiber | Henan Province Longda Biology Technology Co.,Ltd. | YUSI |

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# 从纤维开始

绿色纤维
GREEN FIBER

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- 无毒、环境友好的浆料、染料、
整理剂等高新技术产品
和清洁生产工艺
- 消费后不会因遗弃或处理带来环境问题，
可循环利用或回归自然

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- 正在保护一片森林免遭砍伐
- 正在为环保做出更多贡献……


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