普通高等教育“十二五”部委级规划教材（高职高专）

普通高等教育“十一五”国家级规划教材（高职高专）

染整专业英语

RANZHENG ZHUANYE YINGYU

（第2版）

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中国纺织出版社

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内 容 提 要

本书是针对染整技术专业学生学习和使用英语的需要而编写的，内容基本覆盖了染整专业技术的各个方面。全书共分六章：第一章着重介绍纤维的理化性质，并对纱、织物的组成和特点作了简介；第二章为前处理工艺内容，涉及准备、烧毛、退浆、煮练、漂白、热定形和丝光；第三章为染色，内容涉及染料的种类、性质、染色设备和各种织物的染色工艺；第四章为印花，介绍各种常见的印花方法和方式；第五章为后整理，对机械、化学以及特殊整理工艺进行介绍；第六章为印染织物测试，分别介绍前处理、染色和印花织物的质量要求和测试方法。另外，在附录部分收入了一些印染专业英文术语，并附有详细的英文释义，便于读者准确理解词汇，作为资料备查。

本教材适合高职高专染整技术专业的学生使用，也可供从事染整技术工作的人员学习和参考。

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出版者的话

《国家中长期教育改革和发展规划纲要》(简称《纲要》)中提出“要大力发展职业教育”。职业教育要“把提高质量作为重点。以服务为宗旨,以就业为导向,推进教育教学改革。实行工学结合、校企合作、顶岗实习的人才培养模式”。为全面贯彻落实《纲要》,中国纺织服装教育学会协同中国纺织出版社,认真组织制订“十二五”部委级教材规划,组织专家对各院校上报的“十二五”规划教材选题进行认真评选,力求使教材出版与教学改革和课程建设发展相适应,并对项目式教学模式的配套教材进行了探索,充分体现职业技能培养的特点。在教材的编写上重视实践和实训环节内容,使教材内容具有以下三个特点:

(1)围绕一个核心——育人目标。根据教育规律和课程设置特点,从培养学生学习兴趣和提高职业技能入手,教材内容围绕生产实际和教学需要展开,形式上力求突出重点,强调实践。附有课程设置指导,并于章首介绍本章知识点、重点、难点及专业技能,章后附形式多样的思考题等,提高教材的可读性,增加学生学习兴趣和自学能力。

(2)突出一个环节——实践环节。教材出版突出高职教育和应用性学科的特点,注重理论与生产实践的结合,有针对性地设置教材内容,增加实践、实验内容,并通过多媒体等形式,直观反映生产实践的最新成果。

(3)实现一个立体——开发立体化教材体系。充分利用现代教育技术手段,构建数字教育资源平台,开发教学课件、音像制品、素材库、试题库等多种立体化的配套教材,以直观的形式和丰富的表达充分展现教学内容。

教材出版是教育发展中的重要组成部分,为出版高质量的教材,出版社严格甄选作者,组织专家评审,并对出版全过程进行跟踪,及时了解教材编写进度、编写质量,力求做到作者权威、编辑专业、审读严格、精品出版。我们愿与院校一起,共同探讨、完善教材出版,不断推出精品教材,以适应我国职业教育的发展要求。

中国纺织出版社

教材出版中心

第2版前言

本教材是全国纺织服装职业教育教学指导委员会染整技术专业教学指导委员会所确定的染整技术专业全国统编教材之一。

本教材第1版为普通高等教育“十一五”国家级规划教材(高职高专),于2009年7月出版以来深受广大专业院校师生欢迎,但随着纺织行业技术水平的发展,新产品、新工艺、新设备的不断问世以及教育部对纺织高等职业教育提出了新的要求,本教材中部分内容已不适用,因此,应广大读者要求,特对本教材中的部分内容进行修订。例如,增加了无水染色技术、数码印花技术、外贸跟单基本流程和一篇染整科技论文阅读材料等,更正和弥补了第1版教材中存在的一些错误和疏漏。

本次修订工作在第1版教材编写分工的基础上,主要由成都纺织高等专科学校伏宏彬、阳建斌完成。在修订过程中,得到了全国纺织服装职业教育教学指导委员会染整技术专业教学指导委员会的指导和同行的大力支持,在此深表谢意。

由于编者水平有限,书中难免存在疏漏和不妥之处,恳请广大读者批评指正。

编　者

2015年1月

第1版前言

《染整专业英语》是染整技术专业学生的一门重要专业基础课程。随着我国与世界各国交往的日益频繁，特别是在加入世界贸易组织后，我国纺织品生产和贸易等领域与国际接轨日益紧密，专业英语作为专业人员进行跨国界交流与沟通的必要手段，显得愈发重要。本书的编写，除了为高职高专类学生提供专业英语学习教材，提高学生的英语水平，适应未来的发展，还可以作为染整专业技术人员及相关工作人员的参考书。

本书具有以下特点：

1. 涉及所有的常用印染技术，并引入了部分染整领域的新技术、新工艺和新发展的内容；

2. 所用文章以工艺技术类为主，理论分析类为辅；

3. 文字简洁流畅，通俗易懂，尽量使用简单句和常用表达方式；

4. 内容丰富，能满足不同层次的教学需要。

本书是为已经学习过公共英语，了解英语基本语法和句法，并拥有一定数量词汇的学生编写的。因此，对于普通的语法和句法不再作介绍，但对于不易理解的专业词汇、短语和句子，则作必要的解释。为了便于学生阅读和练习翻译，课文后还附有阅读材料。

全书由伏宏彬统稿，并完成音标部分的编写。本书第3章、第4章由成都纺织高等专科学校的阳建斌、李振华编写，第1章、第5章由成都纺织高等专科学校的伏宏彬编写，第2章由武汉职业技术学院的徐华编写，第6章由成都纺织高等专科学校的郑光洪编写。成都纺织高等专科学校的郑光洪教授对本书的编写提出了许多宝贵的建议并对全书进行主审。本书在编写过程中得到高职高专染整技术专业委员会的指导和同行的支持，在此深表谢意。

由于编者水平有限，疏漏和不妥之处在所难免，恳请同行和读者批评指正。

编　者

2009年2月

课程设置指导

课程名称：染整专业英语

适用专业：染整技术

总 学 时：45

课程性质：染整专业英语是染整技术专业的一门专业课

课程目的：本课程以提高学生英语阅读能力，并能正确领会专业文章的主要内容为目的，使学生掌握一定量的专业词汇，了解国际上染整工业的发展水平，基本掌握相关专业文献的翻译方法和技巧。

课程教学的基本要求：教学环节包括课堂教学、作业和考查。

1. 课堂教学：采用讲练结合的方式讲授，使学生掌握重要的专业词汇，正确理解全文。

2. 课外作业：正确阅读英语原文，对重要的专业术语进行中英文互译。

3. 考试环节：采用口试与笔试相结合的方式。

教学学时分配

章　数	教学内容	讲授学时
Chapter 1	Fibre, Yarn and Fabric	8
Chapter 2	Pre-treatment Processes of Textiles	8
Chapter 3	Dyeing of Textiles	10
Chapter 4	Printing of Textiles	8
Chapter 5	Finishing of Textiles	6
Chapter 6	Textile Testing	5
合　计		45

Contents

Chapter 1

Fibre, Yarn and Fabric

1.1 Text

What is a fibre

Fibres are the foundation of textile industry. All textiles are made up of fibres. All of the production flows and formulae in textiles wet processing stages including pre-treatment, dyeing, printing and final finishing are designed and conducted on the basis of the properties of the fibres from which the textiles are made. [1] So it is necessary for us to review the fibre's definition and properties before we discuss the wet treatment of textiles.

What is a fibre? Fibre is the smallest visible unit of matter that has a high length to diameter ratio, fineness and flexibility.

The above definition for textile fibres is very broad. So many things are demanded of fibres in many different uses. However, some characteristics can be identified which all textile fibres must have if they are to be commercially successful: a high length to diameter ratio, strength, extensibility and elasticity; resistance to chemicals, heat and sunlight, and ability to take colour. [2]

1. Length to diameter ratio

Fibres generally have a small cross-sectional area and a length that greatly exceeds the diameter. For cotton and wool, the length to diameter ratio is in the region of 2000∶1 to 5000∶1. These fibres are produced naturally in short lengths, known as staple fibre. The fibre lengths vary from 10 to 50 millimeters for cotton and from 50 to 200 millimeters for wool. Man-made fibres can be produced with many kilometers of yarn on a single package. The length to diameter ratio of the fibre is then infinite. This type of fibre is termed continuous filament. Silk is the only natural continuous filament fibre. Many man-made fibres are also produced as staple, so that they can be processed on the same machinery as the natural staple fibres.

2. Strength

The strength of a textile material ultimately depends on the strength of the individual fibres from which it is made. Consequently, fibres must have a certain level of strength if they are to be useful. A high strength is clearly more important in fibres used for reinforcement of the rubber in a tire than for the fibres used in a knitted jumper.

3. Extensibility and elasticity

In use stresses will frequently be applied to textile materials. The materials need to extend under the stress and be flexible. The fibres in a pair of tights need to extend every time when the wearer bends her legs. But having extended, the fibres need to be elastic and return to their original length. If they do not, the tights will quickly become wrinkly at the knees and ankles. Tights are just one particular application, all fibres need to be extensible and elastic, but to different degree.

4. Resistance to chemicals, heat and sunlight

In normal use and during care procedures, fibres will be exposed to conditions that may damage them. These conditions may include chemicals such as acids, alkalis, bleachers, detergents, or organic solvents including dry cleaning fluid, and physical effects such as heat or sunlight. The extent to which fibres are exposed depends on the particular use. Resistance to sunlight is more important in curtains than it is in underwear. Almost all fibres are exposed to harmful conditions to some extent. Domestic washing powders are mildly alkali and contain bleachers. The temperature during normal ironing can easily reach 200 ℃. The effect of the high temperature on the fibres will be slow in most case and involve some weakening, with perhaps yellowing of white fibres and loss of brightness of coloured products. [3]

5. Ability to be coloured

Most fibres are normally an off-white colour. Life would be very dull if all textile products were off-white. [4] Consequently, fibres need to be coloured ideally, they should be coloured by dyeing at a late stage of processing; this enables a quick response to customers' demands for the latest shade.

Fibres are usually grouped in order to research or discuss or apply them conveniently. Most of fibres are polymer. Based on their chemical composition, fibres can be classified into many groups such as cellulosic fibre, protein fibre, viscose fibre, polyamide fibre, polyester fibre and polyacrylic fibre, etc. But the most convenient grouping divides them into two basic groups according to their origins, i. e. natural and man-made fibres. Natural fibres refer to all fibres that occur in fibre form in nature, including cotton, linen, wool, silk, and so on, which have been known and used for thousands of years. As natural fibres cannot meet the requirements of people, many polymers that do not naturally exist in the form of fibre have been processed into the fibre form, usually by forcing the viscous polymers through a spinneret that consists of a series of tiny holes arranged in a circle, and used as fibres. These products are known as man-made fibres. [5] Most of the man-made fibres have only been produced in the last 40 years, but they have made a great difference to present-day society, in the types of clothes that we wear as well as the comfort and convenience of living.

The two basic groups can then be further subdivided. The natural fibres can be subdivided into the three types of cellulosic, protein and mineral fibres according to their origins. The cellulosic

fibres come from plant materials, the protein fibres come from animal sources and there is a mineral fibre in nature, which is asbestos. Man-made fibres are usually subdivided into four groups: regenerated, modified, synthetic and mineral fibres, according to their polymer origins. The regenerated fibres are manufactured from natural polymers and can be divided into three types: rayon, acetate and protein. Modified fibres include diacetate and triacetate fibres, which are also made from cellulose, but the cellulose is modified chemically so that it can be dissolved in an organic solvent. Synthetic fibres are those fibres that are made synthetically from the raw materials none of which is previously polymer in nature. The term "synthetic" means that the polymer is entirely man-made. Mineral fibres in the category of synthetic fibres are glass, steel and carbon fibres, all of which are found in industrial end-uses. Table 1-1 shows the classifications of general fibres.

Table 1-1 The classifications of general fibres

Natural fibres			Man-made fibres			
Cellulosic	Protein	Mineral	Regenerated	Modified	Synthetic	Mineral
Cotton	Wool	Asbestos	Viscose rayon	diacetate	Polyamide	Glass
Flax	Silk		Cuprammonium rayon	triacetate	Polyeaster	Steel
Jute	Mohair		Protein regenerated fibre		Polyacrylic	Carbon
Ramie	Cashmere				Polyolefin	
	Other animal hair				Polyvinyl	
					Elastane	

New words

1. fibre ['faibə] *n.* 纤维,纤维制品
2. pre-treatment ['pri:ˌtri:tmənt] *n.* 前处理
3. dyeing ['daiiŋ] *n.* 染色,染色工艺,染色工程
4. printing ['printiŋ] *n.* 印花,印花工艺
5. finishing ['finiʃiŋ] *n.* 后整理,织物整理
6. fineness ['fainnis] *n.* 细度,纯度,光洁度,延伸率
7. flexibility [ˌfleksəbiliti] *n.* 柔软性,揉曲性,适应性,机动性
8. strength [streŋθ] *n.* 强力,强度,浓度
9. extensibility [iksˌtensə'biliti] *n.* 伸长性,延伸性,延展性
10. elasticity [ilæs'tisiti] *n.* 弹性,弹性学,弹力,伸缩力
11. resistance [ri'zistəns] *n.* 阻拒性,抵抗,抵抗力,阻力
12. cross-sectional ['krɔs'sekʃənəl] *adj.* 横切面的
13. staple ['steipl] *n.* 纤维,短纤维,毛束,纤维长度
14. yarn [jɑ:n] *n.* 纱,纱线
15. filament ['filəmənt] *n.* 丝,长丝
16. knitted [nitid] *adj.* 针织的
17. jumper ['dʒʌmpə] *n.* 妇女穿的套头外衣,连兜头帽的皮外衣
18. stress [stres] *n.* 应力
19. tights [taits] *n.* 紧身衣裤
20. wrinkle ['riŋkl] *n.* 皱纹,褶皱
21. acid ['æsid] *n.* 酸

22. alkali [ˈælkəlai] *n.* 碱
23. bleacher [ˈbliːtʃə] *n.* 漂白剂,漂白坯布,漂白工厂,漂白工人
24. detergent [diˈtəːdʒənt] *n.* 洗涤剂,净洗剂
25. weakening [ˈwiːkəniŋ] *n.* 变弱,弱化
26. yellowing [ˈjeləuiŋ] *n.* 泛黄,变黄
27. brightness [ˈbraitnis] *n.* 明亮,鲜艳,鲜艳度,(色彩)明度
28. off-white [ˈɔːfwait] *adj.* 灰白,黄白色,奶白
29. shade [ʃeid] *n.* 颜色,色调,色泽,色光;明暗的程度
30. polymer [ˈpɔlimə] *n.* 聚合物
31. cellulosic [ˌseljuˈləusik] *adj.* 纤维素的
32. protein [ˈprəutiːn] *n.* 蛋白质 *adj.* 蛋白质的
33. viscose [ˈviskəus] *n.* 黏胶液,黏胶(纤维)
34. polyamide [pɔliˈæmaid] *n.* 聚酰胺
35. polyester [ˈpɔliestə] *n.* 聚酯
36. polyacrylic [ˌpɔliˈsaiklik] *n.* 聚丙烯酸化合物
37. cotton [ˈkɔtn] *n.* 棉,棉花,棉线
38. linen [ˈlinin] *n.* 亚麻,亚麻纺织品 *adj.* 亚麻的,亚麻布的
39. viscous [ˈviskəs] *adj.* 黏性的
40. spinneret [ˈspinəret] *n.* 纺丝头,喷丝头
41. mineral [ˈminərəl] *n.* 矿物,矿石
42. asbestos [æzˈbestɔs] *n.* 石棉
43. regenerate [riˈdʒenərit] *vt.* 使新生 *vi.* 新生,再生 *adj.* 新生的,更新的
44. modified [ˈmɔdifaid] *adj.* 改性的,改良的,改进的
45. synthetic [sinˈθetik] *adj.* 合成的,人造的
46. rayon [ˈreiɔn] *n.* 人造丝,人造纤维
47. acetate [ˈæsiˌteit] *n.* 醋酸盐,醋酯,醋酯纤维
48. cellulose [ˈseljuləus] *n.* 纤维素
49. flax [flæks] *n.* 亚麻,麻布
50. jute [dʒuːt] *n.* 黄麻
51. ramie [ˈræmi] *n.* 苎麻,苎麻纤维
52. mohair [ˈməuhɛə] *n.* 马海毛,安哥拉山羊毛 *adj.* 马海毛制的
53. cashmere [kæʃˈmiə] *n.* [纺]开司米,山羊绒,羊绒
54. cuprammonium [ˌkjuːprəˈməuniəm] *n.* 铜氨液,铜氨纤维
55. polyolefin [ˌpɔliˈəuləfin] *n.* 聚烯烃
56. polyvinyl [ˌpɔliˈvainil] *n.* 聚乙烯
57. elastane [iˈlæstein] *n.* 聚氨酯弹性纤维,简称氨纶;(德)伊莱斯坦(商标名)

Phrases and expressions

1. wet process 湿加工
2. length to diameter ratio 长径比
3. diacetate fibre 二醋酯纤维
4. triacetate fibre 三醋酯纤维

Notes

[1] All of the production flows and formulae in textiles wet processing stages including pre-treatment, dyeing, printing and final finishing are designed and conducted on the basis of the properties of the fibres from which the textiles are made.

纺织品湿加工各个阶段包括前处理、染色、印花和后整理工序中所有的生产流程和配方,都是根据组成纺织品的纤维的性质而设计和实施的。

[2] However, some characteristics can be identified which all textile fibres must have if they are to be commercially successful: a high length to diameter ratio, strength, extensibility and elasticity; resistance to chemicals, heat and sunlight, and ability to take colour.

然而作为商品化的纺织纤维必须具有如下特性:较高的长径比,强度、延伸性和弹性,耐化学药品腐蚀、耐热和耐日晒,具有着色性。

[3] The effect of the high temperature on the fibres will be slow in most case and involve some weakening, with perhaps yellowing of white fibres and loss of brightness of coloured products.

高温对纤维的影响在大多数情况下是缓慢的,包括使纤维强度下降,同时伴随有使白色的纤维泛黄和使有色产品的色彩鲜艳度降低的情况发生。

[4] Life would be very dull if all textile products were off-white.

如果所有的纺织品都是灰白色的,我们的生活会显得非常没有生气。

虚拟语气,主句为 would + 动词原形结构,从句为 if + 主语 + 动词过去式结构,表示与现在事实相反。

[5] As natural fibres cannot meet the requirements of people, many polymers that do not naturally exist in the form of fibre have been processed into the fibre form, usually by forcing the viscous polymers through a spinneret that consists of a series of tiny holes arranged in a circle, and used as fibre. These products are known as man-made fibres.

当天然纤维不能够满足人们的需求时,许多并不以纤维形式存在的聚合物被人为加工成纤维形状,常用的方法是经过挤压使这些聚合物的黏液通过由一系列的圆形微孔所组成的纺丝头而被加工成纤维使用——这些产品叫作化学纤维。

Exercises

Ⅰ. Answer the following questions.

1. Which stages are included in textiles wetting process?
2. What is a fibre?
3. What characteristics must all textile fibres have?
4. What is the length to diameter ratio?
5. In which conditions will fibres be damaged?
6. How are fibres classified?

Ⅱ. Translate the following sentences into Chinese.

1. Many man-made fibres are also produced as staple, so that they can be processed on the same machinery as the natural staple fibres.

2. A high strength is clearly more important in fibres used for reinforcement of the rubber in a tire than for the fibres used in a knitted jumper.

3. These conditions may include chemicals such as acids, alkalis, bleachers, detergents, or organic solvents including dry cleaning fluid, and physical effects such as heat or sunlight.

4. Consequently, fibres need to be coloured ideally, they should be coloured by dyeing at a late stage of processing; this enables a quick response to customers' demands for the latest shade.

5. Based on their chemical composition, fibres can be classified into many groups such as cellulosic fibre, protein fibre, viscose fibre, polyamide fibre, polyester fibre and polyacrylic fibre, etc.

6. Synthetic fibres are those fibres that are made synthetically from the raw materials none of which is previously polymer in nature.

Reading material

Fine structure of fibre

Fibre structure can be viewed at three different levels: i. e. gross morphology, fine structure and chemical structure. The gross morphology of a fibre is normally defined as the shape and appearance of the fibre under an optical microscope. The fine structure of a fibre is concerned with the arrangement of the polymer molecules within the fibre. The chemical structure of a fibre is concerned with the characteristics of the molecules which make up the fibre.

Unlike microscopic examinations where difference in fibre surface and characteristic shapes can be identified and appropriately labeled, fine structure cannot be observed even by the most powerful microscopes. The information that exists in this field comes from X-ray studies and other equally elaborate techniques.

The pattern of molecular arrangement within any fibre varies widely. The molecules may be highly oriented, which means that they run parallel to each other and to the longitudinal axis of the fibre. Alternatively, they may be of low orientation, in which case they mostly lie at an angle to one another, crossing over at various points.

Linear polymer molecules cannot be completely ordered along their entire lengths. They tend to pass through alternating regions of order and disorder. Where several molecules converge and follow the same path for a fraction of their entire length, they give rise to crystallization — parallel arrangements of molecules held together by strong intermolecular forces. Where they fail to come together in the manner described, they form non-crystalline or amorphous regions.

Many attempts have been made to illustrate this phenomenon by simulation and model making. The fringed micelle is one such model which was first proposed in the 1930s and to a large extent still remains fundamentally appropriate.

1.2 Text

Natural cellulosic fibres

The basis of the chemical composition of all vegetable fibres is cellulose, which is present to a greater or lesser extent. Apart from these vegetable fibres, some man-made fibres, such as viscose and cuprammonium rayon fibres also consist of cellulose. In order to distinguish them from the

man-made cellulosic fibres, the vegetable fibres are called natural cellulosic fibres.

Natural cellulosic fibres are usually divided into four types: seed fibres (such as cotton and kapok), bast fibres (flax, jute and ramie), leaf fibres (sisal and pina) and fruit fibres (coir).

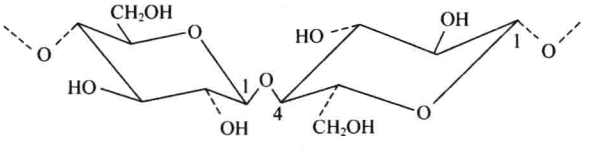
1. Cotton

Cotton is by far the most important textile fibre and makes up nearly 50 percent of the total weight of fibres used in the world.[1] Cotton is obtained from the cotton plant that grows in warm climates in most part of the world. Cotton is single cell fibre and develops from the epidermis of the cotton seed. Cotton consists of cellulose and non-cellulosic materials. Non-cellulosic materials in cotton fibre include protein, wax, pectin, mineral substances, etc. They can range from 4% to 12% together and are referred to as impurities by the manufacturer of cotton goods. Table 1-2 shows the composition of mature cotton fibres.

Table 1-2 Composition of mature cotton fibres

Constituents	Percentage by dry weight(%)	Constituents	Percentage by dry weight(%)
Cellulose	88.0 – 96.5	Ash	0.7 – 1.6
Protein	1.0 – 1.9	Pectin	0.4 – 1.2
Wax	0.4 – 1.2	Others	0.5 – 0.8

Cellulose can be considered to be a condensation polymer formed from the glucose units. Initially, two glucose units combine to form a cellobiose molecule with the elimination of water; and these polymerize further to form a chain of cellobiose. The molecular structure of cellulose is shown as followed:



The molecular structure of cellulose

The helical reversal structure of natural cellulose shows the constantly recurring cellobiose unit, consisting of two glucose units each with six carbon atoms. The length of the cellobiose unit along the fibre axis is 1.03 nm. There are 3000 – 5000 C_6 or glucose units joined together in natural cellulosic fibres. This corresponds to a molecular weight of 300000 – 500000.

The morphological structure of the cotton fibre is described as follows. The most outer layer of the cotton fibre is the cuticle covered with waxes and pectins, and this surrounds a primary wall,