全国纺织高职高专规划教材

染整专业英语

RANZHENG ZHUANYE YINGYU

李振华　伏宏彬　郑光洪　编著

中国纺织出版社

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内 容 提 要

本书是针对印染专业学生和技术人员学习和使用英语的需要而编写的。它基本上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、织物的组成和特点做了简介；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、染色和印花织物的性质要求和测试方法。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。本书内容丰富、通俗易懂，适合染整专业学生、技术人员以及广大英语爱好者使用。

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序

翻开中国教育史，早在19世纪60年代，在清政府的洋务运动中，就已经孕育出职业教育的胚芽。民国初年，职业教育得到了初步发展。新中国成立之后，我国的职业教育才进入了一个新的历史时期，建立了社会主义职业教育体系，为我国的国民经济恢复、发展和工业基础的奠定做出了历史性的贡献。然而，当时由于对职业教育缺乏准确的界定和社会对职业教育的认可程度不高，阻碍了职业教育的发展。随着我国社会、经济的不断发展和教育改革的逐步深入，职业教育的地位才逐步被社会、国家所重视。特别是1996年和1998年，当时的国家教委和后来的教育部先后提出“三改一补”和“三多一改”的大力发展高等职业教育的方针，全国高等职业院校才如雨后春笋般地发展起来。

纺织高等职业技术院校就是在这样的背景下建立和发展起来的。目前已发展成为纺织行业各类教育中一支重要的教育体系。

为了使纺织高等职业技术教育健康稳步发展，中国纺织服装教育学会高职高专教学工作委员会按照《教育部关于加强高职高专教育人才培训工作的意见》的有关要求，在制定了纺织高职高专专业目录（指南）的基础上，召开了专门工作会议，成立了6个专业教学指导委员会和相关教材编写委员会，并和中国纺织出版社及东华大学出版社一道规划了纺织高职高专首批教材30余种。在中国纺织服装教育学会高职高专教学工作委员会的直接领导下，在全国纺织高职高专院校、中国纺织出版社和东华大学出版社的积极支持参与下，在各个教材编写委员会的共同努力下，终于完成了首批纺织高职高专全国统编教材，以期满足纺织高职高专院校教学的需要。

尽管有如此众多的单位、院校、部门和众多的专家、教授、学者的共同努力，但仍不能说这套教材已经尽善尽美，错误及不准确之处在所难免。希望广大同行、教师和使用者及时提出宝贵意见，以期提高这套教材的整体质量。

中国纺织服装教育学会

高职高专教学工作委员会

前言

《染整专业英语》是按中国纺织服装教育学会高职高专教学工作委员会于2004年通过的编写大纲编写的专业教材。

《染整专业英语》是染整技术专业学生学习英语的一门重要课程。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国际间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，课文后还附有参考译文和阅读材料。

全书由李振华统稿，音标部分由伏宏彬完成。本书第3章、第4章由成都纺织高等专科学校的李振华编写，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，加之是第一次编写高职高专染整类专业英语教材，疏漏和不妥之处在所难免，恳请同行和读者批评指正。

编　者

2005年4月

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. 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[1]. 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[3]. 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.

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 polycrylic 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 requirement 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. 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		Polycrylic	Carbon
Ramie	Cashmere				Polyolefin	
	Other animal hair				Polyvinyl	
					Elastane	

New words

1. fibre ['faibə] *n.* 纤维,纤维制品
2. yarn [jɑ:n] *n.* 纱,纱线
3. fabric ['fæbrik] *n.* 织物,布,织品
4. pre-treatment ['pri:-ˌtri:tmənt] *n.* 前处理
5. dyeing ['daiiŋ] *n.* 染色,染色工艺,染色工程
6. printing ['printiŋ] *n.* 印花,印花工艺
7. finishing ['finiʃiŋ] *n.* 后整理,织物整理

8. fineness [ˈfainnis] *n.* 细度,纯度,光洁度,延伸率
9. flexibility [ˌfleksəbiliti] *n.* 柔软性,揉曲性,适应性,机动性
10. strength [streŋθ] *n.* 强力,强度,浓度
11. extensibility [iksˌtensəˈbiliti] *n.* 伸长性,延伸性,延展性
12. elasticity [ilæsˈtisiti] *n.* 弹性,弹性学,弹力,伸缩力
13. resistance [riˈzistəns] *n.* 阻拒性,抵抗,抵抗力,阻力
14. cross-sectional [ˈkrɔs-ˈsekʃənəl] *adj.* 横切面的
15. staple [ˈsteipl] *n.* 纤维,短纤维,毛束,纤维长度
16. filament [ˈfiləmənt] *n.* 丝,长丝
17. knitted [nitid] *adj.* 针织的
18. jumper [ˈdʒʌmpə] *n.* 妇女穿的套头外衣,连兜头帽的皮外衣
19. stress [stres] *n.* 应力
20. tights [taits] *n.* 紧身衣裤
21. wrinkle [ˈriŋkl] *n.* 皱纹,褶皱
22. acid [ˈæsid] *n.* 酸
23. alkali [ˈælkəlai] *n.* 碱
24. bleacher [ˈbliːtʃə] *n.* 漂白剂,漂白坯布,漂白工厂,漂白工人
25. detergent [diˈtəːdʒənt] *n.* 洗涤剂,净洗剂
26. weakening [ˈwiːkəniŋ] *n.* 变弱,弱化
27. yellowing [ˈjeləuiŋ] *n.* 泛黄,变黄
28. brightness [ˈbraitnis] *n.* 明亮,鲜艳,鲜艳度,(色彩) 明度
29. off-white [ˈɔːf-wait] *adj.* 灰白,黄白色,奶白
30. shade [ʃeid] *n.* 颜色,色调,色泽,色光;明暗的程度
31. polymer [ˈpɔlimə] *n.* 聚合物
32. cellulosic [ˌseljuˈləusik] *adj.* 纤维素的
33. protein [ˈprəutiːn] *n.* 蛋白质 *adj.* 蛋白质的
34. viscose [ˈviskəus] *n.* 粘胶液,粘胶纤维
35. polyamide [pɔliˈæmaid] *n.* 聚酰胺
36. polyester [ˈpɔliestə] *n.* 聚酯
37. polycrylic [ˌpɔliˈsaiklik] *n.* 聚丙烯酸化合物,腈纶
38. cotton [ˈkɔtn] *n.* 棉,棉花,棉线
39. linen [ˈlinin] *n.* 亚麻,亚麻纺织品 *adj.* 亚麻的,亚麻布的
40. viscous [ˈviskəs] *adj.* 黏性的

41. mineral [ˈminərəl] *n.* 矿物,矿石
42. spinneret [ˈspinəret] *n.* 纺丝头,喷丝头
43. asbestos [æzˈbestɔs] *n.* 石棉
44. regenerate [riˈdʒenərit] *vt.* 使新生 *vi.* 新生,再生 *adj.* 新生的,更新的
45. modified [ˈmɔdifaid] *adj.* 改性的,改良的,改进的
46. synthetic [sinˈθetik] *adj.* 合成的,人造的
47. rayon [ˈreiɔn] *n.* 人造丝,人造纤维
48. acetate [ˈæsi,teit] *n.* 醋酸盐,醋酯,醋酯纤维
49. flax [flæks] *n.* 亚麻,麻布
50. cellulose [ˈseljuləus] *n.* 纤维素
51. jute [dʒu:t] *n.* 黄麻
52. ramie [ˈræmi] *n.* 苎麻,苎麻纤维
53. mohair [ˈməuhɛə] *n.* 马海毛,安哥拉山羊毛 *adj.* 马海毛制的
54. cashmere [kæʃˈmiə] *n.* [纺]开司米,山羊绒,羊绒
55. cuprammonium [ˌkju:prəˈməuniəm] *n.* 铜氨液,铜氨纤维
56. polyolefin [ˌpɔliˈəuləfin] *n.* 聚烯烃
57. polyvinyl [ˌpɔliˈvainil] *n.* 聚乙烯
58. 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] So many things are demanded of fibres in many different uses.

这里,"So many things"指"非常多的东西","demand of"为"需求、需要"。

[2] However,...they are to be...to take colour.

"are to"表示"必须"的意思,常用于条件从句。

[3] The fibre lengths vary from 10 to 50 millimeters for cotton and from 50 to 200 millimeters for wool.

此句是一种并列句的简略结构。后一句省略主谓语,即"The fibre lengths vary"。

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

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。

Translated text

什么是纤维

纤维是纺织工业的基础,所有的纺织品都是由纤维制造的。纺织品湿加工过程包括前处理、染色、印花和后整理等工序。其生产流程和配方都是根据组成纺织品纤维的性质进行设计和实施的。因此,在讨论纺织品的湿加工之前,有必要回顾一下纤维的定义及其性质。

什么是纤维?纤维是最小的可见物质单元,它具有较高的长径比、细度和柔韧性。

上述定义对纺织纤维来讲太宽泛了。不同的用途对纤维的要求不同,然而作为商品化的纺织纤维必须具有以下特性:高的长径比、强度、延伸性和弹性、耐化学药品、耐热和耐日晒以及着色性。

1. 长径比

纤维通常横切面积较小,其长度远远超过直径。棉和羊毛的长径比为 2000∶1 ~ 5000∶1。这些纤维天生较短,称为短纤维。例如,棉纤维长度为 10 ~ 50 mm,而羊毛纤维长度为 50 ~ 200 mm。一个纱卷的人造纤维就是一根长达数千米的长丝,这类纤维的长径比趋近于无穷大。因此,这种类型的纤维被称作连续长丝。真丝是唯一的天然连续长丝纤维。许多人造纤维也以短纤形式生产,以便它们能在加工天然短纤的设备上进行加工。

2. 强度

纺织材料的强度主要取决于构成它的单纤的强度。因此,有用的纤维必须具有一定的强度。显然,高强力对于在轮胎中作为橡胶增强材料的纤维比作为针织外衣的纤维更重要。

3. 延伸性和弹性

纺织材料在使用中常被施加应力。在应力的作用下,材料要延伸和变形。紧身裤中的纤维会随着穿着者的每一次腿部的弯曲而伸展。然而延长之后,纤维还需要有弹性,才能回到它们原始的长度。如果纤维没有弹性,那么这条紧身裤很快就会在膝和脚踝部起皱。紧身裤仅仅是一个特殊的使用情况,所有的纤维都需具有延伸性和弹性,只是程度不同而已。

4. 耐化学药品、耐热和耐日晒

在正常的使用和护理期间,纤维会受到很多因素的损害,这些因素包括化学品(如酸、碱、漂白剂、清洁剂),有机溶剂(如干洗剂),以及热和日光的物理作用。纤维暴露的程度取决于特定的用途。耐日光性在窗帘中比在内衣裤中显得更加重要。几乎所有的纤维都在某种程度上暴露在有害的条件下。家用洗衣粉是弱碱性的并含有漂白剂。一般熨烫过程中温度很容易达

到200 ℃。高温对纤维的影响在大多数情况下是缓慢的,包括使纤维的某些性能弱化,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。

5. 可着色性

大多数的纤维通常是灰白色的。如果所有的纺织品都是灰白色的,我们的生活会变得非常暗淡。若想纤维被理想地、完美地着色,就应该在加工处理的后阶段进行染色,这样才能对消费者提出的最新颜色要求给出一个快速的响应。

为了便于研究、讨论或应用,通常将纤维分类。大多数的纤维是聚合物。按其化学组成,纤维可被分为许多类型,如:纤维素纤维、蛋白质纤维、粘胶纤维、聚酰胺纤维、聚酯纤维和聚丙烯腈纤维等。最方便的分类方法是根据纤维的来源把它们分成两种基本类型,即天然纤维和人造纤维。天然纤维指所有以纤维形式从自然界中产生的纤维,包括棉、亚麻、羊毛和蚕丝等等,这些纤维已被人们认识并使用了数千年。当天然纤维不能够满足人们的需求时,许多并不是以纤维形式天然存在的聚合物被加工成纤维形状。通常,这些黏性的聚合物经挤压通过由一系列呈圆形排列的微孔所组成的纺丝头而被加工成纤维形状,并且作为纤维使用,这些产品叫做人造纤维。大部分人造纤维在最近40年才被生产出来,但是它们使现代社会发生了很大的改变,如我们穿着的衣服类型、生活的舒适性和方便性。

这两种基本类型可以进一步细分。天然纤维根据其来源可再分为纤维素纤维、蛋白质纤维和矿物纤维三种类型。纤维素纤维来自植物原料,蛋白质纤维来自动物,在自然界中还有一种矿物纤维即石棉。根据聚合物的来源,人造纤维通常再分为四种类型:再生纤维、改性纤维、合成纤维和矿物纤维。再生纤维由天然的聚合物制造,分为三种类型:粘胶纤维、醋酯纤维和蛋白质纤维。改性纤维包括二醋酯纤维和三醋酯纤维,它们都由纤维素制造,这些纤维素通过化学改性而能溶解于有机溶剂中。合成纤维是通过合成非天然存在的聚合物原料而制得的。“合成”一词表明聚合物完全是人造的。在合成纤维范畴中的矿物纤维有玻璃纤维、钢纤维和碳纤维,它们全部用于工业。表1-1列举了常见纤维的分类。

表1-1 常见纤维的分类

天然纤维			人造纤维			
纤维素纤维	蛋白质纤维	矿物纤维	再生纤维	改性纤维	合成纤维	矿物纤维
棉花	羊毛	石棉	粘胶人造丝	二醋酯纤维	聚酰胺纤维	玻璃
亚麻	丝		铜氨纤维	三醋酯纤维	聚酯纤维	钢
黄麻	马海毛		蛋白质再生纤维		聚丙烯腈纤维	碳
苎麻	羊绒				聚烯烃纤维	
	其他动物毛发				聚乙烯纤维	
					聚氨酯弹性纤维	

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