高 等 学 校 教 材

化学工程与工艺专业英语

大学英语专业阅读教材编委会组织编写

华东理工大学 胡鸣 刘霞 编

化学工业出版社

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前　言

组织编审出版系列的专业英语教材，是许多院校多年来共同的愿望。在高等教育面向 21 世纪的改革中，学生基本素质和实际工作能力的培养受到了空前重视。对非英语专业的学生而言，英语水平和能力的培养不仅是文化素质的重要部分，在很大程度上也是能力的补充和延伸。在此背景下，教育部(原国家教委)几次组织会议研究加强外语教学问题，制订有关规范，使外语教学更加受到重视。教材是教学的基本要素之一，与基础英语相比，专业英语教学的教材问题此时显得尤为突出。

国家主管部门的重视和广大院校的呼吁引起了化学工业出版社的关注，他们及时地与原化工部教育主管部门和全国化工类专业教学指导委员会请示协商后，组织全国十余个院校成立了大学英语专业阅读教材编委会。在经过必要的调研后，根据学校需求，编委会优先从各校教学(交流)讲义中确定选题，同时组织力量开展编审工作。本套教材涉及的专业主要包括化学工程与工艺、石油化工、机械工程、信息工程、生产过程自动化、应用化学及精细化工、生化工程、环境工程、制药工程、材料科学与工程、化工商贸等。

根据“全国部分高校化工类及相关专业大学英语专业阅读教材编审委员会”的要求和安排编写的《化学工程与工艺专业英语》教材，可供化工类及相关专业本科生使用，也可以作为同等程度（通过大学英语四级）的专业技术人员自学教材。

内容与结构　教材分为四部分(PART)，每个部分中含有 4～8 个单元(UNIT)，每单元由一篇课文和一篇阅读材料构成。阅读材料提供与课文相关的背景知识，以进一步拓宽课文内容，为学生自学（开拓视野和训练阅读技能）提供合适的材料。根据课文和阅读材料的内容，配有相应的练习题。各篇课文之间、课文与所配阅读材料之间，既有一定的内在联系，又独立成章，可根据不同学时数灵活选用。课文及阅读材料共计四十二篇，均选自原版英文教科书、科技报告、专著及专业期刊，大部分为国外 90 年代以来的出版物。其中：

PART 1 为化学过程工业概述，包括化学工业概况、现代化工发展过程、化工原料来源、R & D、化学工程师能胜任的工作等；

PART 2 为化学工艺学简述，主要介绍基本化工工艺过程，如硫酸、氯碱、合成氨、炼油、煤加工过程、聚合物及加工；

PART 3 为化学工程学科的主要领域，介绍传递过程、化工热力学的基本概念、典型的化工单元操作（包括设备）和化学反应工程；

PART 4 为过程开发的基础知识和化学工程前沿研究领域，如过程开发、化工设计、CAE 及环境、生物和能源加工中的化学工程问题。

附录内容有：专利基本知识，化工设计的信息和数据来源，常用有机化合物名称，化学化工常用构词和总词汇表。

词汇与练习 在专业英语阅读阶段，掌握一定数量的科技词汇（包括专业词汇）是教学的主要要求之一。本教材覆盖了化学工程与工艺专业的基本内容，包含基本的化学工程与工艺的专业英语词汇和相当数量的常用科技词汇。整个教材注意前后呼应，词汇的复现率高，每个单元均有词汇练习，有利于学生比较牢固地掌握基本词汇。教材中对超出大学英语四级词汇表的单词和词组（约1400个）均在首次出现的课文和阅读材料后注出。附录中列出总词汇表。

大纲中对专业英语阅读阶段的学习技能有明确的要求，有针对性的练习是训练阅读技能的有效手段。本教材在设计练习时，作了一些尝试，主要的练习型式为：

①课文前设问题或要求。根据课文内容设计的问题或要求，置于课文前面，以激发学生通过阅读获取信息的欲望，有利于学生调动背景知识，变被动阅读为主动阅读。

②大部分课文配有摘要填空的练习形式，要求学生在规定时间内选用课文中的（一般不多于3个）词填空，培养学生通篇浏览（Surveying）、查找信息（Locating Information）及寻找关键词（Keywords）的能力，这是对阅读技能的一种强化训练，也是对学生语言能力和专业知识水平的一种有效考查方式。

③细节的理解填充题。要求对指定段落或流程所含的信息目标集中地进行分析，然后填出练习题中的步骤或化合物。由于过程中环环相扣，如不理解透彻，将无法正确回答问题。

④作读书笔记型练习。训练学生区分主要信息与次要细节的技能，通过归纳要点和对比过程，完成读书笔记。

⑤教材中没有指定英译中翻译练习，教师可从课文和阅读材料中选取。

阅读能力与阅读教学 阅读活动的基本过程是：认读——理解——吸收，这也是构成阅读能力的三个基本因素。阅读，首先要认识所读的文字符号（词汇辨识、句子结构分析），能将上下句、上下段连贯起来，明白全篇的意思，并有一定的速度。这种能力人们称之为认读能力。阅读，更需要有理解能力，所谓阅读的理解能力，是指对文章主题、所论述的原理和概念、作者的观点、以及文章的逻辑结构能够全面的了解与领会。阅读能否将读物的精华与有价值的东西储存起来并加以消化而变为自己的知识结构的有机组成部分，就要看吸收能力如何了。所谓阅读的吸收能力，是指对读物鉴别、记忆、消化的能力。如果阅读一种读物，尽管能够读下来也能理解，但读过之后就忘光了，便是无效的阅读，不能算作具备了阅读能力。

在分析阅读能力的结构时，通常没有明确提出吸收能力来，好像理解能力可以包括吸收能力，但事实上，理解代替不了吸收。认读、理解、吸收，是构成阅读能力不可缺少也不能相互替代的三个重要因素。认读是基础，理解是核心，吸收是结果，三者是一个紧密联系着的整体，人们进行阅读，先认读，后理解，再吸收，进程虽有先后之分，但三者并不是彼此孤立、互相排斥的，而是认读中有一定的理解、理解中有一定的吸收。人们边认读、边理解、边吸收的速度愈快，他们的阅读能力愈强。这本专业英语阅读教材在一定程度上展示了化学工程与工艺专业的知识结构，为全面地训练阅读能力提供了基础材料，相信能得以充分利用。

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叶圣陶先生在论及语文教育时指出："阅读教学之目的，我以为首在养成读书之良好习惯。教师辅导学生认真诵习课本，其意乃在使学生渐进于善读，终于能不待教师之辅导而自臻于通篇明晓。"显然，他的话也适合英语阅读教学。应该承认，现代教学的实践性还大有加强的余地：阅读课程往往讲得过细，语言结构上下功夫过多。阅读教学应强调以学生为中心，将学生的学习积极性充分调动起来，提供较多机会让学生多读快读，反复实践，最终使学生养成良好的阅读习惯，真正提高阅读能力。希望这本专业英语阅读教材和所设计的阅读理解练习将有助于比较全面地训练和培养学生阅读能力。

致谢 本教材在成书过程中得到了化学工业出版社和华东理工大学教务处大力支持，得到了华南理工大学、大连理工大学和江苏石油化工学院等各参编单位的理解和帮助，北京化工大学吴祥芝教授审阅了全书，并提出了许多宝贵的意见，谨在此一并表示衷心感谢。本教材从结构到练习设计都是一种尝试，我们热诚希望使用本书的广大师生向我们提出宝贵意见。

编　者

1998 年 6 月

内 容 提 要

《化学工程与工艺专业英语》是根据《大学英语教学大纲》（理工科本科用）的专业阅读部分的要求编写的，供理工科大学化学工程与工艺专业或相关专业三四年级学生使用，也可供同等英语程度化学工程师或相关领域的科技人员使用。

课文及阅读材料共计四十二篇，均选自原版英文教科书、科技报告、专著及专业期刊（大部分为国外90年代以来的出版物）。其中第一部分1~4课，介绍化学过程工业；第二部分5~9课介绍基本化工工艺过程；第三部分10~17课为化学工程学科的领域；第四部分18~22课介绍过程开发的基础知识和化学工程与工艺的前沿研究领域。附录内容有：专利基本知识，化工设计的信息和数据来源，常用有机化合物名称和化学化工常用构词以及总词汇表。每篇课文均配有阅读理解练习和词汇练习。为便于学生自学，本书每课配有单词和词组表，并作必要的注释。

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秘书

何仁龙　华东理工大学教务处

Contents

PART 1 CHEMICAL PROCESS INDUSTRY

Unit 1 Chemical Industry

Before reading the text below, try to answer following questions:

1. When did the modern chemical industry start?
2. Can you give a definition for the chemical industry?
3. What are the contributions which the chemical industry has made to meet and satisfy our needs?
4. Is the chemical industry capital- or labor-intensive? Why?

1. Origins of the Chemical Industry

Although the use of chemicals dates back to the ancient civilizations, the evolution of what we know as the modern chemical industry started much more recently. It may be considered to have begun during the Industrial Revolution, about 1800, and developed to provide chemicals for use by other industries. Examples are alkali for soapmaking, bleaching powder for cotton, and silica and sodium carbonate for glassmaking. It will be noted that these are all inorganic chemicals. The organic chemicals industry started in the 1860s with the exploitation of William Henry Perkin's ① discovery of the first synthetic dyestuff—mauve. At the start of the twentieth century the emphasis on research on the applied aspects of chemistry in Germany had paid off handsomely, and by 1914 had resulted in the German chemical industry having 75% of the world market in chemicals. This was based on the discovery of new dyestuffs plus the development of both the contact process for sulphuric acid② and the Haber process for ammonia③. The latter required a major technological breakthrough that of being able to carry out chemical reactions under conditions of very high pressure for the first time. The experience gained with this was to stand Germany in good stead, particularly with the rapidly increased demand for nitrogen-based compounds (ammonium salts for fertilizers and nitric acid for explosives manufacture) with the outbreak of World War I in 1914. This initiated profound changes which continued during the inter-war years (1918~1939).

Since 1940 the chemical industry has grown at a remarkable rate, although this has slowed significantly in recent years. The lion's share of this growth has been in the organic chemicals sector due to the development and growth of the petrochemicals area since 1950. The explosive growth in petrochemicals in the 1960s and 1970s was largely due to the enormous increase in demand for synthetic polymers such as polyethylene, polypropylene, nylon, polyesters and epoxy resins.

The chemical industry today is a very diverse sector of manufacturing industry, within which it

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plays a central role. It makes thousands of different chemicals which the general public only usually encounter as end or consumer products. These products are purchased because they have the required properties which make them suitable for some particular application, e.g. a non-stick coating for pans or a weedkiller. Thus chemicals are ultimately sold for the effects that they produce.

2. Definition of the Chemical Industry

At the turn of the century there would have been little difficulty in defining what constituted the chemical industry since only a very limited range of products was manufactured and these were clearly chemicals, e.g., alkali, sulphuric acid. At present, however, many thousands of chemicals are produced, from raw materials like crude oil through (in some cases) many intermediates to products which may be used directly as consumer goods, or readily converted into them. The difficulty comes in deciding at which point in this sequence the particular operation ceases to be part of the chemical industry's sphere of activities. To consider a specific example to illustrate this dilemma, emulsion paints may contain poly (vinyl chloride)/poly (vinyl acetate). Clearly, synthesis of vinyl chloride (or acetate) and its polymerization are chemical activities. However, if formulation and mixing of the paint, including the polymer, is carried out by a branch of the multinational chemical company which manufactured the ingredients, is this still part of the chemical industry or does it now belong in the decorating industry?

It is therefore apparent that, because of its diversity of operations and close links in many areas with other industries, there is no simple definition of the chemical industry. Instead each official body which collects and publishes statistics on manufacturing industry will have its definition as to which operations are classified as "the chemical industry". It is important to bear this in mind when comparing statistical information which is derived from several sources.

3. The Need for Chemical Industry

The chemical industry is concerned with converting raw materials, such as crude oil, firstly into chemical intermediates, and then into a tremendous variety of other chemicals. These are then used to produce consumer products, which make our lives more comfortable or, in some cases such as pharmaceutical products, help to maintain our well-being or even life itself. At each stage of these operations value is added to the product and provided this added value exceeds the raw material plus processing costs then a profit will be made on the operation. It is the aim of chemical industry to achieve this.

It may seem strange in textbook like this one to pose the question "do we need a chemical industry?" However, trying to answer this question will provide (i) an indication of the range of the chemical industry's activities, (ii) its influence on our lives in everyday terms, and (iii) how great is society's need for a chemical industry. Our approach in answering the question will be to consider the industry's contribution to meeting and satisfying our major needs. What are these? Clearly food (and drink) and health are paramount. Other which we shall consider in their turn are clothing and (briefly) shelter, leisure and transport.

(1) *Food.* The chemical industry makes a major contribution to food production in at least three ways. Firstly, by making available large quantities of artificial fertilizers which are used to replace the elements (mainly nitrogen, phosphorus and potassium) which are removed as nutrients by the growing crops during modern intensive farming. Secondly, by manufacturing crop protection chemicals, i.e., pesticides, which markedly reduce the proportion of the crops consumed by pests. Thirdly, by producing veterinary products which protect livestock from disease or cure their infections.

(2) *Health.* We are all aware of the major contribution which the pharmaceutical sector of the industry has made to help keep us all healthy, e.g. by curing bacterial infections with antibiotics, and even extending life itself, e.g. β-blockers to lower blood pressure.

(3) *Clothing.* The improvement in properties of modern synthetic fibers over the traditional clothing materials (e.g. cotton and wool) has been quite remarkable. Thus shirts, dresses and suits made from polyesters like Terylene® and polyamides like Nylon are crease-resistant, machine-washable, and drip-dry or non-iron. They are also cheaper than natural materials.

Parallel developments in the discovery of modern synthetic dyes and the technology to "bond" them to the fiber has resulted in a tremendous increase in the variety of colors available to the fashion designer. Indeed they now span almost every color and hue of the visible spectrum. Indeed if a suitable shade is not available, structural modification of an existing dye to achieve this can readily be carried out, provided there is a satisfactory market for the product.

Other major advances in this sphere have been in color-fastness, i.e., resistance to the dye being washed out when the garment is cleaned.

(4) *Shelter, leisure and transport.* In terms of shelter the contribution of modern synthetic polymers has been substantial. Plastics are tending to replace traditional building materials like wood because they are lighter, maintenance-free (i.e. they are resistant to weathering and do not need painting). Other polymers, e.g. urea-formaldehyde and polyurethanes, are important insulating materials for reducing heat losses and hence reducing energy usage.

Plastics and polymers have made a considerable impact on leisure activities with applications ranging from all-weather artificial surfaces for athletic tracks, football pitches and tennis courts to nylon strings for racquets and items like golf balls and footballs made entirely from synthetic materials.

Likewise the chemical industry's contribution to transport over the years has led to major improvements. Thus development of improved additives like anti-oxidants and viscosity index improves for engine oil has enabled routine servicing intervals to increase from 3000 to 6000 to 12000 miles. Research and development work has also resulted in improved lubricating oils and greases, and better brake fluids. Yet again the contribution of polymers and plastics has been very striking with the proportion of the total automobile derived from these materials——dashboard, steering wheel, seat padding and covering etc. — now exceeding 40%.

So it is quite apparent even from a brief look at the chemical industry's contribution to meeting our major needs that life in the world would be very different without the products of the industry. Indeed the level of a country's development may be judged by the production level and

sophistication of its chemical industry.

4. Research and Development (R&D) in Chemical Industries

One of the main reasons for the rapid growth of the chemical industry in the developed world has been its great commitment to, and investment in research and development (R&D). A typical figure is 5% of sales income, with this figure being almost doubled for the most research intensive sector, pharmaceuticals. It is important to emphasize that we are quoting percentages here not of profits but of sales income, i.e. the total money received, which has to pay for raw materials, overheads, staff salaries, etc., as well. In the past this tremendous investment has paid off well, leading to many useful and valuable products being introduced to the market. Examples include synthetic polymers like nylons and polyesters, and drugs and pesticides. Although the number of new products introduced to the market has declined significantly in recent years, and in times of recession the research department is usually one of the first to suffer cutbacks, the commitment to R&D remains at a very high level.

The chemical industry is a very high technology industry which takes full advantage of the latest advances in electronics and engineering. Computers are very widely used for all sorts of applications, from automatic control of chemical plants, to molecular modeling of structures of new compounds, to the control of analytical instruments in the laboratory.

Individual manufacturing plants have capacities ranging from just a few tonnes per year in the fine chemicals area to the real giants in the fertilizer and petrochemical sectors which range up to 500,000 tonnes. The latter requires enormous capital investment, since a single plant of this size can now cost $250 million! This, coupled with the widespread use of automatic control equipment, helps to explain why the chemical industry is capital- rather than labor-intensive.

The major chemical companies are truly multinational and operate their sales and marketing activities in most of the countries of the world, and they also have manufacturing units in a number of countries. This international outlook for operations, or globalization, is a growing trend within the chemical industry, with companies expanding their activities either by erecting manufacturing units in other countries or by taking over companies which are already operating there.

Selected from "*The Chemical Industry*, 2nd Edition, Alan Heaton, by Blackie & Son Ltd., 1997"

Words and Expressions

1. alkali ['ælkəlai] n. 碱（性，质），强碱
2. bleaching ['bli:tʃiŋ] n. 漂白 a. 漂白的
3. silica ['silikə] n. 二氧化硅，硅石
4. sodium ['soudjəm] n. 钠，Na
5. carbonate ['kɑ:bənit] n. 碳酸盐，碳酸脂
   ['kɑ:bəneit] vt. 碳化，使化合成碳酸盐(脂)；充碳酸气于
6. inorganic [inɔ:'gænik] a. 无机的，无机物的

7. dyestuff n. 染料，颜料，着色剂
8. mauve [məuv] n. 苯胺紫(染料) a. 紫红色的，淡紫色的
9. sulphuric [sʌl'fjurik] a. (正、含)硫的，(含)硫磺的
10. ammonia [ə'məunjə] n. 氨(水)
11. stand ... in goodstead 对…很有用 （很有帮助）
12. ammonium [ə'məunjəm] n. 铵(基)
13. fertilizer ['fə:tilaizə] n. 肥料（尤指化学肥料）
14. nitric ['naitrik] a. (含)氮的，硝酸根的
15. the lion's share 较大部分，最大部分
16. petrochemical [petrəu'kemikəl] a. 石油化学的 n. 石油化学制品
17. polymer ['pɔlimə] n. 聚合物（体），高（多）聚物
18. polyethylene [pɔli'eθili:n] n. 聚乙烯
19. polypropylene [pɔli'prəupili:n] n. 聚丙烯
20. nylon ['nailən] n. 酰胺纤维，尼龙，耐纶
21. polyester [pɔli'estə] n. 聚酯
22. epoxy [e'pɔksi] n. 环氧树脂
23. resin ['rezin] n. 树脂 vt. 用树脂处理
24. dilemma [di'lemə] n. 困境，进退两难；二难推论
25. emulsion [i'mʌlʃən] n. 乳胶，乳(化，状，浊)液，乳剂
26. poly- [词头] 多，聚，重，复
27. poly n. 多，聚
28. vinyl ['vainil] n. 乙烯基，乙烯树脂
29. chloride ['klɔ:raid] n. 氯化物，漂白剂
30. acetate ['æsitit] n. 醋酸盐（脂），乙酸盐（酯，根）；醋酸纤维素
31. polymerization [pɔlimərai'zeiʃən] n. 聚合(反应，作用)
32. formulation [fɔ:mju'leiʃən] n. 配方，组成；公式化，列方程式
33. ingredient [in'gri:diənt] n. （混合物的）成分，组分，配料
34. pharmaceutical [fɑ:mə'sju:tikəl] n. 药物（品，剂） a. 医药的，制药的，药物的，
35. paramount ['pærəmaunt] a. 最高的，高过，优于（to）
36. in one's turn 值班，替代，依次
37. phosphorus ['fɔsfərəs] n. 磷 P，磷光体；启明星，金星
38. potassium [pəu'tæsiəm] n. 钾 K
39. pesticide ['pestisaid] n. 农药，杀虫剂
40. pest [pest] n. 害虫，灾害
41. veterinary ['vetərinəri] n. 兽医 a. 兽医的
42. livestock n. (总称)家畜，牲畜
43. bacterial [bæk'tiəriəl] a. 细菌的
44. antibiotic [æntibai'ɔtik] n. 抗生（菌）素，抗生素学 a. 抗菌的
45. terylene ['terili:n] n. 涤纶，聚（对苯二甲酸乙二醇）酯纤维，的确良
46. polyamide [pɔli'æmaid] n. 聚酰胺，尼龙

47. crease [kri:s] n. (衣服、纸等的)折缝，皱痕
48. drip-dry ['drip'drai] vi. 易快速晾干，晾干自挺
49. hue [hju:] n. 色彩，色调，色泽
50. spectrum ['spektrəm] n.（光、波，能，质）谱，频谱；范围，领域
51. garment ['gɑ:mənt] n. （一件）衣服；[pl.]服装
52. urea ['juəriə] n. 尿素，脲
53. formaldehyde [fɔ:'mældihaid] n. 甲醛
54. urea-formaldehyde resin 脲(甲)醛树脂
55. polyurethane n. 聚氨基甲酸(乙)酯，聚氨酯
56. athletic [æθ'letik] a. 体育的，运动的；运动员的
57. racquet = racket ['rækit] n.（网球、羽毛球等的）球拍；乒乓球拍
58. additive ['æditiv] n. 添加剂，加成剂 a. 附加的，加成的
59. antioxidant ['ænti'ɔksaid ənt] n. 抗氧化剂，防老化剂
60. viscosity [vis'kɔsiti] n. 粘度
61. grease [gri:s] n. 脂肪；润滑脂（俗称牛油，黄油）
62. dashboard n. （车辆的）挡泥板，仪表板
63. overhead ['əuvəhed] n. 企业一般管理费；[化]塔顶馏出物
64. recession [ri'seʃən] n.（工商业的）衰退；（价格的）暴跌；后退
65. fine chemical 精细化学药品

Notes

① Willim Henry Perkin：1838～1907，英国合成染料发明者。1856 年 8 月 26 日，他在自家简陋的化学实验室，试图用重铬酸钾处理苯胺（含有甲苯胺）合成奎宁时，得到一种紫色的沉淀，发现能用来染丝，当时认为其具有优良的染色效果。同年申请并获得专利权，取名苯紫胺(mauve)，并在格林福格林进行工业生产，这是世界上第一个合成染料。

② contact process for sulphuric acid：接触法硫酸生产工艺。应用固体催化剂，以空气中的氧直接氧化二氧化硫，所得三氧化硫被水吸收后，得到硫酸或发烟硫酸。其生产过程通常分为二氧化硫的制备，二氧化硫的转化和三氧化硫的吸收三部分。

③ Haber process for ammonia：用氮气和氢气直接合成氨。

Fritz Haber：1868～1939，德国物理化学家，合成氨发明者。1909 年 7 月 2 日，他在实验室内用锇催化剂将氮气和氢气在高压下直接合成，得到浓度为 6%的氨。其后，在工业化学家 Carl Busch 的协助下，成功地解决了工业生产中的技术问题。这种合成氨的方法称为 Haber-Busch Process。因发明用氮气和氢气直接合成氨的方法，Fritz Haber 获 1918 年诺贝尔化学奖。

Carl Busch：1874～1940，德国工业化学家。他的重大成就之一是使 Fritz Haber 发明的合成氨法实现工业化。因在高压化学合成技术上作出了重大贡献，获 1931 年诺贝尔化学奖。

④ 此处"provided"为连词，作"只要"解，引导一个条件从句。由于从句中 that (provided that) 常省略，注意不要与动词 provide 的过去时、过去分词混淆。

⑤ Terylene: 涤纶。对苯二酸与 1，2-乙二醇缩合而产生的直链聚酯纤维的商品名，广泛用于制造织物、衣料和其他纺织品。

⑥ 分词短语作状语。此处含伴随、结果的意思。

Exercises

1. *Complete the summary of the text. Choose* ***No More Than Three Words*** *from the passage for each answer.*

The modern chemical industry came about during [1]_____ about 1800. However, there was no [2]_____ side of the industry to speak of before 1860. By the early years of the 20th century advances into synthetic pharmaceuticals and some new dyestuffs had been made, and two important processes— [3]_____for sulphuric acid and [4]_____ for ammonia were developed. The major industrial developments in organic chemicals initiated in the 1930-1940 period have continued since that time. Demand for [5]_____ stimulated the explosive growth in petrochemicals in 1960s and 1970s. The chemical industry today is a very diverse sector of manufacturing industry. It makes thousands of different chemicals in the forms as raw materials, [6]_____ and products, and it's not as easy as it seems to definite "the chemical industry."

Chemical products arguably improve our lives and lifestyles, and we could not live the way we do without them. For example, agriculture relies on the chemical industry for its large quantities of [7]_____ and [8]_____. Modern [9]_____and synthetic dyes provide a good market for clothing. We should also draw attention to the many life saving and therapeutic drugs and medicines produced by the [10]_____ sector of the industry. Modern synthetic polymers play an increasing role in building industry, and plastics and polymers find many applications in leisure and transport areas.

A major characteristic of the chemical industry is its great emphasis on [11]_____. The scale of operations within the industry ranges from quite small plants in the fine chemicals area to the giants of the fertilizer and [12]_____ sectors. Heavy capital investments, extremely widespread use of [13]_____ partly explain why the industry is [14]_____.

2. *Completing the following table, by listing the chemicals as many as you can.*

Some Chemicals Used in Our Daily Life

Food		Shelter	
Health		Leisure	
Clothing		Transport	

3. *Put the following into Chinese:*

carbonate	polypropylene	epoxy	vinyl
acetate	pharmaceutical	spectrum	formaldehyde
silica	ammonium	polyester	the lion's share

4. *Put the following into English:*

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