

# 新编 EST 科技英语阅读 Advanced Reading

汪 丽 编 著

■ 满足理工科大学高年级学生学习科技英语的需要

着重阅读能力的培养

■ 适用于想要提高科技英语阅读能力的理工科研究生

以及具有一定英语水平的科技工作者



华南理工大学出版社  
SOUTH CHINA UNIVERSITY OF TECHNOLOGY PRESS

# 新编 EST 科技英语阅读 Advanced Reading

第二版

主编：王德林

副主编：王德林

主审：王德林

主审：王德林



机械工业出版社

# 新编 EST 科技英语阅读 Advanced Reading

汪丽 编著



华南理工大学出版社  
SOUTH CHINA UNIVERSITY OF TECHNOLOGY PRESS

· 广州 ·

## 图书在版编目 (CIP) 数据

新编科技英语阅读 = EST Advanced Reading / 汪丽编著. — 广州: 华南理工大学出版社, 2015. 12

ISBN 978 - 7 - 5623 - 4854 - 2

I. ①新… II. ①汪… III. ①科学技术 - 英语 - 阅读教学 - 高等学校 - 教材  
IV. ①H319.4

中国版本图书馆 CIP 数据核字 (2015) 第 308557 号

## 新编科技英语阅读

汪丽 编著

---

出 版 人: 卢家明

出版发行: 华南理工大学出版社

(广州五山华南理工大学 17 号楼, 邮编 510640)

<http://www.scutpress.com.cn> E-mail: [scutcl3@scut.edu.cn](mailto:scutcl3@scut.edu.cn)

营销部电话: 020 - 87113487 87111048 (传真)

策划编辑: 黄丽谊

责任编辑: 李彩霞

印 刷 者: 虎彩印艺股份有限公司

开 本: 787mm × 960mm 1/16 印张: 14.25 字数: 331 千

版 次: 2015 年 12 月第 1 版 2015 年 12 月第 1 次印刷

定 价: 36.00 元

---

版权所有 盗版必究 印装差错 负责调换

## 前言

随着高科技和信息时代的到来,科技英语在全球科技合作与交流中发挥着越来越重要的作用。为适应新时期科技人才培养的需求,也为了增加学生的就业资质,高等院校理工科本科《大学英语教学大纲》中规定,非英语专业大学英语教学应在前四学期开设大学英语基础课,在第五至第七学期开设必修的英语阅读课程。

我国许多高校以及职业技术学院都开设了科技英语课程,此类课程的开设对于拓宽学生知识面,提高学生对科技语言的创新运用能力,培养国际型人才起到了促进作用。为了配合科技英语课程教学,专家和学者们编写了一些科技英语阅读教程。但是科学技术是发展的,教材文章也应该是不断地推陈出新,适应新时代发展需要的,因此,本书作者编写了这本《新编科技英语阅读》。

本书课文节选自著名的权威科普期刊《美国科学家》(*American Scientist*)近期发表的文章,内容涉及物理、化学、光学、电学、微分子物理学、计算机、心理学和生物学等学科。课文后设有科技英语文体特点和科技英语阅读技巧介绍,并配有相应的练习。本书编写的宗旨是满足理工科大学高年级学生学习科技英语的需要,着重阅读能力的培养。阅读材料量大是本书的一大特点,因为本书作者认为理工科背景的学生将来面临的挑战是阅读大量的科技文献——从学生毕业后的实际情况来看,他们要从浩如烟海的外语资料中获取有关信息,没有较强的英语阅读能力不行;对于立志海外求学的学生来说,要想顺利完成留学学业,也必须要具有强硬的英语阅读能力。因此加强阅读训练,提高英语,特别是科技英语的阅读能力是十分重要的。

本书也适用于想要提高科技英语阅读能力的理工科研究生,以及具有一定英语水平的科技工作者。衷心希望通过本书的学习,学生们的科技英语阅读能力能得到显著的提高,为今后的科研工作或出国留学打下坚实的阅读基础。

由于编者水平的限制,书中定有不当之处,诚请指正。

编者

2015年7月

# Contents

Unit 1	What Creates Static Electricity?	(1)
	Stylistic Features of EST I	(21)
Unit 2	The Information Paradox	(28)
	Stylistic Features of EST II	(45)
Unit 3	A Palette of Particles	(54)
	EST Reading Skills—Reading for Main idea I	(72)
Unit 4	Bonding to Hydrogen	(78)
	EST Reading Skills—Reading for Main idea II	(91)
Unit 5	Cracking with Electricity	(100)
	EST Reading Skills—Skimming and Scanning	(107)
Unit 6	Empirical Software Engineering	(119)
	EST Reading Skills—Meaning	(135)
Unit 7	Herschel and the Puzzle of Infrared	(140)
	EST Reading Skills—Words and Expressions of Contrast	(159)
Unit 8	The Man Behind the Curtain	(163)
	EST Reading Skills—Prefix, Root and Suffix	(176)
Unit 9	Mind Wandering	(185)
Unit 10	Plenty of Room at the Bottom?	(198)
	Keys to the Exercises	(217)
	References	(224)

# Unit 1 What Creates Static Electricity? <sup>1</sup>

By Meurig W. Williams<sup>2</sup>

## What You Are Going to Read?

**T**his article illustrates that, although a static, or triboelectric discharge may cause bad effects from discomfort to disaster like the airship Hindenburg's explosion, static isn't all bad: It makes copiers and laser printers possible. But what actually creates triboelectric charges remains a cutting-edge field of research. The author discusses at a fundamental level charge exchange mechanism on the electron and ion transfer basis.

## Text

Traditionally considered a physics problem, the answer is beginning to emerge from chemistry and other sciences.

When two objects are brought into contact and then separated, electrical **charges** are generated at the surfaces. Such events are called **triboelectric** charges, also known as contact or static charges. Triboelectricity is one of the oldest areas of scientific study, dating back to experiments by the ancient Greek philosopher Thales of Miletus, who discovered that rubbing amber against wool led to **electrostatic** charging.

charge *n.* 电荷

*v.* 充电, 起电, 带电

discharge *n. v.* 放电

triboelectric *adj.* 摩擦电的

electrostatic *adj.* 静电的; 静电学的

static *n.* 静电; 静电干扰

*adj.* 静电的; 静态的

Indeed, triboelectric in Greek means “rubbing amber”; however, rubbing is not necessary because such charging also results from simple **nonfrictional** contacts.

The buildup of this electrical **potential** can lead to electrostatic discharge, with consequences that can range from discomfort to disaster. Results can be as mild as a **jolt** we experience by touching a doorknob after walking across a rug in dry weather, or as **dire** as the crash of the Hindenburg<sup>3</sup>, where one theory for the cause of the airship fire is that a static spark **ignited** a **hydrogen** leak. Such discharges are a major concern for NASA<sup>4</sup> because the dry conditions on the Moon and Mars are ideal for triboelectric charging: An astronaut, reaching out to open an airlock after a walk on the dry surface, may cause a discharge that could **zap** critical electronic equipment. But not all static is a **nuisance**: Triboelectric charging, when controlled, is at work in products such as copiers and laser printers.

Although static electricity is a familiar subject, much still remains unknown about how and why such charges form. Research across many disciplines of science and engineering, from physics and chemistry to medicine and **meteorology**, is currently being conducted on triboelectricity's various aspects. However, relatively few scientists are engaged in understanding it at a fundamental level.

Contact charge exchange between two metals is known to result from the transfer of **electrons**. But when at least one of the materials is an electrical **insulator**, there is no general understanding of what carries charges from one surface to the other. Different theories have proposed either electrons or **ions**. An electron is a **subatomic** particle carrying a negative electrical charge; an electrical current involves movement of electrons in a metal conductor. An ion, on the other hand, can carry either a positive or a negative electric charge; they

nonfrictional *adj.* 非摩擦的

potential *n.* 电势

jolt *n. v.* 颠簸; 摇晃; 震颤

dire *adj.* 可怕的; 悲惨的; 极端的

ignite *v.* 点火; 点燃; 使燃烧

hydrogen *n.* 氢

zap *vt.* 攻击; 打败

nuisance *n.* 讨厌的人(东西); 麻烦事; 损害

meteorology *n.* 气象学; 气象状态

electron *n.* 电子

insulator *n.* 绝缘体

ion *n.* 离子

subatomic *adj.* 亚原子的; 原子内部的

sub- 在……之下的; 次的



are known as **cations** and **anions**, respectively. A cation has fewer electrons than **protons**, giving it a positive charge. An anion possesses more electrons than protons, so it has a net negative charge. Cations and anions can be atoms, **molecules** or **polymer fragments**. Evidence has been discovered for both electron and ion transfer under specific experimental conditions, but these data are limited and frequently contradictory. Recently, new research has demonstrated that charge exchange can also result from the physical transfer of tiny amounts of surface material from one substance to another. An understanding of how this occurs on a molecular level is now just beginning to **emerge**. It is becoming increasingly clear that more than one mechanism can occur simultaneously, and what happens may depend on the material compositions and conditions of the experiments in ways not yet known.

Remarkably, why **charge exchange** happens at all when insulators are **involved** is even less well understood than how it occurs, although the inherent complexity of the problem has long been appreciated<sup>5</sup>. How does a material that by definition does not conduct electricity nonetheless gain an electrical charge? Three questions must be answered: Are the charge exchange **species** electrons or ions, what is the driving force for charge exchange and what limits the charge exchange? Traditionally considered to be a problem in physics, progress on finding the specific mechanisms of charge exchange did not really begin until the application of several areas of chemistry. One reason that answers have been slow in coming is lack of incentive<sup>6</sup>: Most research involving triboelectricity **is applied to** the development of new technologies and to solving problems, and understanding the mechanisms of charge exchange is not required for these purposes—a charge is just a charge, regardless of how and why it occurs. However, a clear picture of charging mechanisms

cation *n.* 阳离子; 正离子

anion *n.* 阴离子

proton *n.* 质子

molecules *n.* 分子

polymer *n.* [高分子] 聚合物

fragment *n.* 段; 片段

emerge *vi.* 浮现; 暴露

charge exchange 电荷交换

involved *adj.* 有关的, 被涉及的

species *n.* 种类; 物种

(注意: 单复数形式相同)

be applied to 应用于

could **contribute to** useful purposes when it becomes available.

## The Experience of Xerox

By far the most important commercial products based on triboelectricity are **copiers** and **laser** printers (which use the same technology as copiers but incorporate a laser input), both pioneered by Xerox Corporation<sup>7</sup>. **Electrophotographic** copiers are based on two phenomena: triboelectric charging and **photoconductivity**. **Photoconductors** are materials that become better **conductors** of electricity when exposed to light. Exposure of a charged photoconductor to a light image of a document results in discharge of the **illuminated** area. Charged **toner** particles are allowed to be attracted to the image pattern on the photoconductor, transferred to paper and fused to produce a copy. The toner is triboelectrically charged by mixing it with a carrier, forming what's called a **developer**. Carriers typically consist of beads 100 **micrometers** in diameter, which are partially coated with a polymer. Toner and carrier compositions are selected for optimum triboelectric charging, among other requirements.

It was reasonable at one time to believe that a basic understanding of triboelectricity could provide input into the design of developer materials. The early success of copiers did provide such an incentive, but this achievement continued in spite of no progress in **deciphering** the mechanisms of triboelectric charge exchange in terms of electron or ion transfer.

It was at Xerox in the 1970s that I first developed an interest in this subject when employed as a research chemist with the objective of applying chemistry to the basic understanding of how triboelectric charging is related to material compositions. The first Xerox copiers, introduced in 1960, had barely acceptable copy quality, which resulted from totally **empirical** efforts at the Battelle Memorial Institute<sup>8</sup>

contribute to 有助于, 促进

copier *n.* 复印机 (等于 copier machine)

laser *n.* 激光 (Light Amplification Stimulated Emission Radiation); 激光器

electrophotographic *adj.* 电子照相的

electro- 电子的

photoconductivity *n.* 光电电性; 光电导性

photo- 光; 光电; 照相; 光子

photoconductor *n.* 光电导体; 光电导元件; 光敏电阻

conductor *n.* 导体

conductive *adj.* 导电的; 传导的

illuminate *v.* 照亮

toner *n.* 调色剂; 色粉; 墨粉

developer *n.* 显影剂

micrometer *n.* 微米 (一微米是一毫米的千分之一)

decipher *vt.* 解码; 破译

*n.* 密电译文

de- = down; off 由“向下”之意衍生“分离”之意

cipher *n.* 密码; 暗号

*v.* 做算术, 将……译成密码

empirical *adj.* 完全根据经验的

to design developer materials without any basic understanding of triboelectricity. The difficulty of achieving acceptable copy quality increased **exponentially** with process speed, with the consequence that introduction of the high-speed 9200 copier in the 1970s was not an immediate success—a clear indication that the Xerox version of electrophotography (which they referred to as xerography) was approaching its limits.

Around that time, Xerox gained access to a new kind of electrophotographic technology that provided dramatically superior copy quality. It involved conductive developers and toner charge control using **additives**, a concept later used to provide the first evidence for an ion transfer mechanism in contact charge exchange. This result came from a **fortuitous** series of events starting with competitive analysis—an **episode** that now appears to be a missing part of Xerox history. In 1973, a team of five physicists and one chemist (myself) was asked to analyze the large number of copier-related patents that had been issued to Kodak<sup>9</sup>. Each of us was assigned to a different copier subsystem, with the objective of determining whether Kodak had serious intentions of entering the copier field. I was assigned to review developer materials, and I was the only member of the team to conclude that Kodak did plan to introduce a copier. **Consensus prevailed**, with the consequence that, when the first Kodak Ektaprint copier was introduced in 1975, Xerox was caught by surprise on several fronts.

An Ektaprint copy appeared on my desk with the request that I explain to Xerox management how Kodak could produce copies of vastly superior quality compared with the best Xerox copies at that time—in terms of coverage of the solid areas, edge **acuity** of the printed letters and low levels of **stray** print on the background. My presentation

exponentially *adv.* 以指数方式

additive *n.* 添加剂

fortuitous *adj.* 偶然的；意外的

episode *n.* (组成一个较大事件的) 一个(或一系列)事件；插曲

consensus *n.* 大多数人的意见；舆论

prevail *vi.* 流行；盛行

acuity *n.* 锐度；敏度；敏锐度  
stray *adj.* 杂散的

was received with a high level of disbelief because the Kodak technology differed so much from the basic **design assumptions** held by Xerox. It quickly became evident from analysis of the Kodak developer that their image quality resulted from the use of a conductive developer (with positively charged toners) as opposed to the insulating developers (with negative toners) in use by Xerox.

The difference in copy quality was of such **magnitude** that Xerox immediately realized the need to use the Kodak technology. Xerox physicists **fervently** studied how superior image quality resulted from the use of conductive developers. A team of chemists was established to produce and test toners containing a large number of different **quaternary ammonium** salts in conductive developers. This activity resulted in a series of at least a dozen patents based directly on the Kodak design, filed between 1978 and 1985 and issued to Xerox between 1980 and 1987; I was co-inventor of several of these advances. Remarkably, Kodak never challenged these patents. Kodak's tightly patented technology for producing copy quality superior to that of Xerox and IBM gave it the potential to dominate the copier market, but it failed to capitalize on that advantage and later withdrew from manufacturing copiers. Under what circumstances did Kodak give away their copier-technology crown jewel, especially to a well-established competitor—a subject of some interest in light of the current state of Kodak's fortunes? Could it be related to a Federal Trade Commission (FTC) complaint issued against Xerox in 1973 for alleged unfair competitive practices? Xerox chose to settle the case instead of undertaking **litigation**. As part of the settlement, Xerox was required to license all patents relating to copiers to competitors, but in return “Xerox may require the cross **license** of any patents of any licensee....” Why did Xerox

design assumptions 设计假定

magnitude *n.* 尺度; 大小;  
量级

fervently *adv.* 热心地; 热诚地

quaternary *adj.* 四进制的; 四个  
一组的

*n.* 四; 四个一组

quat-, quad- = four

ammonium *n.* 铵; 氨盐基

litigation *n.* 诉讼; 起诉

license *n.* 特许; 许可证

accept such an **onerous** settlement in a case whose legal issues were relatively evenly balanced? Was it mainly to gain access to Kodak's U.S. Patent 3,893,935 claiming the superior developer materials, which threatened Xerox's future?

A Xerox physicist and prominent early inventor made a comment on Kodak patent strategies at the 2003 Lemelson-MIT Program Intellectual Property Workshop on the subject: How Does Intellectual Property Support the Creative Process of Invention? He stated: "Kodak was using trade secrets more often [than patents]... They would rather keep their inventions as trade secrets, because they did not want them to expire." A curious comment indeed, considering the major contribution that Kodak patents made to Xerox technology, and especially because this remark was made in the presence of the workshop chairman, a retired Xerox senior executive who had been a physics manager at the corporation in the 1970s.

As a consequence of the Kodak-Xerox events, Xerox had found a solution to their imaging problems—and motivation for basic research in triboelectricity at Xerox was lost.

## Evidence for Different Mechanisms

Triboelectricity was classified as a problem in **solid-state physics** because contact charging between two metals had been well understood in terms of the physics of electron transfer. The driving force for this transfer is the difference between the metals' work functions, the energy required to remove an electron from a metal surface. For metal-polymer contacts, researchers had found linear relationships between the density of charge created on a polymer and metal work functions, which was presented as evidence for an electron

onerous *adj.* 繁重的; 麻烦的;  
负有法律责任的

solid-state physics 固体物理学

transfer mechanism. It was later reported that this relationship is not always present, but this discrepancy was attributed to the difficulty of obtaining reproducible results due to the many **variables** involved and the possibility of more than one simultaneous mechanism.

For charging between two insulators, physicists developed theories based on the assumption of an electron transfer mechanism. Although not contributing to the question of the nature of the charge exchange species, these theories have had debatable success in addressing the driving force for charge exchange in terms of the “effective work functions” of insulators. This concept is of questionable **validity** because there are no available free electrons in insulators. But such theories have been more successful in accounting for the limit of charge exchange in terms of the electric field generated by the charges in some cases<sup>10</sup>. In other circumstances, charge buildup is limited when the ambient electric field becomes large enough to exceed the **dielectric** strength of the surrounding air, pulling apart the electrons from the air molecules and turning it from an insulator to a conductor, thus leaking current away from the material.

Clearly, a physics approach was insufficient to address the multidisciplinary problem, but the predominantly physics culture at Xerox didn't recognize that limitation. Eventually a concession was made by a Xerox chemist who reviewed models for the electronic structure of **organic polymers**, with a focus on those having highly ordered groups with rigid, periodic arrays of atoms, some having nearly metallic properties. He concluded that “the description of the electronic structures of these materials requires the introduction of concepts more familiar in the fields of **electrochemistry** and physical chemistry than solid-state physics”.

variable *n.* 变量

*adj.* 变量的; 可变的

validity *n.* 有效性; 效度; 有  
效期

dielectric *adj.* 非传导性的; 诱  
电性的

*n.* 介电质; 电介质

organic polymer 有机聚合物; 有  
机高分子化合物

electrochemistry *n.* 电化学

It was two decades after the Kodak discovery of toner charge control agents that researchers used this design approach, an example of the chemistry concept of mobile ions, to produce evidence for an ion transfer mechanism for triboelectric charging. Many researchers contributed to this major advance, including Arthur Diaz of IBM<sup>11</sup> Almaden Research Center in San Jose, Howard Mizes and Kock-Yee Law of Xerox Corporation, and Logan McCarty and George Whitesides of Harvard University<sup>12</sup>. A mobile ion has freedom to transfer from one surface to another, because it has a **counterion** of opposite charge that is either significantly larger and has less mobility, or is attached to a polymer and has no freedom to transfer. With molecules and polymers containing a mobile ion, the mechanism of charge exchange has indeed been related to the transfer of this ion, both to the sign of charging and to its magnitude. But the driving force for this mechanism remains **elusive**. Charge exchange of equal magnitude also can happen when polymers do not contain mobile ions, so an additional mechanism must be at work. In 2008, McCarty and Whitesides found an answer with their hydroxide ion **hypothesis**, in which water molecules within the thin water layer between polymers **dissociate**, with preferential **adsorption** of the resulting **hydroxide** ( $\text{OH}^-$ ) ions to one surface. **Electrokinetic** evidence supported their hypothesis. But experiments in 2011 by Bartosz Grzybowski and his group at Northwestern University, designed to verify this hypothesis, have shown that charge exchange can take place between two **nonionic** polymers in the total absence of water, thus implicating a mechanism entirely different from both the proposed hydroxide ion hypothesis and ion transfer in general. However, their result does not **preclude** the hydroxide ion mechanism in the presence of water, perhaps representing another situation in which more than one mechanism can

counterion *n.* 平衡离子; 相对离子, 反离子

elusive *adj.* 难以捉摸的; 难懂的

hypothesis *n.* 假设; 假说; 假定

dissociate *v.* 游离; 分裂; 使分离

dis- = apart; away; not (离开; 否定)

adsorption *n.* 吸附 (作用); 吸附性能

ad- = to

hydroxide *n.* 氢氧化物; 氢氧根  
hydro- “氢的, 含氢的”; “水, 液, 流体”之意

electrokinetic *adj.* 动电的; 动电学的

kinetic *adj.* 动力的

nonionic *adj.* 非离子的; 非电离的

non- = not

preclude *vt.* 排除; 阻止; 预防; 杜绝

apply simultaneously.

Major advances in understanding the methods of charge transfer have been reported in the past few years, and in all of them charging results from the application of a significant amount of mechanical force between two polymers, specifically in pressing, rubbing and **shearing** contacts. The field is currently being revolutionized by the application of surface analysis—electrical, chemical and electrochemical. It has long been known that contact of a polymer with another material can result in the transfer of some of the polymer from one surface to another; it was also established that, on a **macroscopic** scale, a triboelectrically charged surface may have both positive and negative regions. In 2011, using Kelvin force **microscopy**—a high-resolution analysis of a surface's electrical properties—Grzybowski and his team demonstrated that material transfer can be accompanied by charge exchange on a **nanoscopic** level when two polymers are pressed together for varying times and degrees of pressure and then separated. This kind of charge exchange was unexpected. For centuries, it had been assumed that, in such contact charging, one surface charges to become uniformly positive and the other uniformly negative. The group found that, although each surface develops a net charge of either positive or negative polarity, each surface also supports a random **mosaic** of oppositely charged regions in nanoscopic dimensions. The net charge on each surface is the **arithmetic sum** of the positively and negatively charged domains. This finding means that more charges are being exchanged than previously assumed. Charging is not an event affecting one in 10,000 surface groups, but more of the order of one charge in 100 surface groups<sup>13</sup>.

Various types of **spectroscopy** and chemical analysis of the surfaces revealed **oxidized** species, believed to be responsible for the charging. This material transfer mechanism

shear *v. n.* 剪切; 修剪

macroscopic *adj.* 宏观的; 肉眼可见的

macro- 巨大的; 大量的

micro-, micr- 微; 小

microscope *n.* 显微镜

microscopy *n.* 显微镜检查

nanoscopic *adj.* 纳米级的

nano- 纳; 毫微

mosaic *n. adj.* 马赛克 (的); 镶嵌 (的); 拼接的

arithmetic sum 算术和

spectroscopy *n.* 光谱学

oxidize *v.* 使氧化; 氧化



was a landmark advance in that it represented the first departure from the electron/ion transfer mechanisms, and also for the first time it accounts for the driving force for charge exchange. Pressing two polymers together, followed by separation, causes small **clumps** of materials to transfer between the surfaces. For this exchange to happen, **covalent bonds** must be broken, with the formation of polymer fragment free radicals at both **scission** sites. **Free radicals** are atoms or molecules having unpaired electrons, which cause them to be highly chemically reactive, and it is believed that they react with ambient oxygen and water to form the charged species.

In 2012, Fernando Galembeck and his coworkers at the University of Campinas in Brazil took this material transfer mechanism a step further. **Teflon** and **polyethylene** were sheared together—pressed and twisted against one another. After separation, the team found macroscopic domains or patterns, both positively and negatively charged, **analogous to** those reported by Grzybowski's group. Materials extracted from the surfaces with **solvents** were identified as polymer ions. The Teflon residues were predominantly negatively charged, and the polyethylene residues were primarily positively charged. Galembeck's team proposed this mechanism: High temperature at the frictional points of contact results in polymer **plasticization** and/or melting. Shear forces cause breaks in the polymer molecules' chains, forming polymer-fragment free radicals. Electron transfer from the polyethylene radicals to the more electronegative Teflon radicals converts these free radicals to positive and negative polymer ions, respectively, which are known as **amphiphiles**. Charged macroscopic domains form due to a combination of two factors: Amphiphiles at **interfaces** are known to sort themselves into arrays when they are in the type of polar environment

clump *n.* 丛; 土块

*v.* (使) 形成一丛; (使)

凝结成块

covalent *adj.* 共价的; 共有原子价的

covalent bond 共价键

scission *n.* 切断, 分离; 断开  
(scissors 剪刀)

free radical 自由基; 游离基

teflon 聚四氟乙烯

polyethylene 聚乙烯

analogous to 类推为, 类同于

solvent *n.* 溶剂

plasticization *n.* 塑化

amphiphile *n.* 亲水脂分子; 双亲化合物

interface *n.* 界面; 交界面;  
(计算机) 接口;