

一部包罗万象的知识宝典

一套营养丰富的文化大餐

◎ 主编 / 孙静确

BILINGUAL ENCYCLOPEDIA FOR TEENAGER

双语青少年百科

Education 教育卷



英国的大学——剑桥与牛津 British Universities: Cambridge and Oxford · 打造一流大学 Working to Build a Top University · 教学的4条关键要素 Four Key Elements That Your Teaching · 物理的奇妙 The Wonders of Physics



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北方文艺出版社



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双语

青少年百科

DOUBLE LANGUAGE
ENCYCLOPEDIA FOR TEENAGER
教育

□主编 / 孙静确



北方文艺出版社

图书在版编目(CIP)数据

双语青少年百科/孙静确 主编. —哈尔滨:北方文艺出版社,2006.5

ISBN 7-5317-1990-8

I. 双... II. 孙... III. 科学知识—青少年读物—英、汉 IV. Z228.2

中国版本图书馆 CIP 数据核字(2006)第 043316 号

双语青少年百科

作 者/孙静确

责任编辑/陈颖杰 张远超

封面设计/刘 玮

出版发行/北方文艺出版社

地 址/哈尔滨市道外区大方里小区 105 号楼

网 址/<http://www.bfwy.com>

邮 编/150020

电子信箱/bfwy@bfwy.com

经 销/新华书店

印 刷/北京铁建印刷厂

开 本/960×640 1/16

印 张/128

字 数/1488 千字

版 次/2006 年 5 月 1 版

印 次/2006 年 5 月 1 次

印 数/5000

定 价/456.00 元(全十六册)

书 号/ISBN 7-5317-1990-8/I·1941



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Sublimation

升华

In winter, people usually hang their washings in the open air and in winter the wet clothes will be frozen. The stiffened clothes will become dry gradually because the ice turns into vapor directly without melting. The white camphor balls are quite big before we put them in the trunk. But several months later, the camphor balls in the trunk will become smaller and smaller and finally they will disappear. But we can sense the



smell of camphor from the clothes.

Where have these camphor balls gone to? Actually, the naphthalene in the camphor ball has changed directly from its solid state to gase-

ous state. This phenomenon of changing from the solid phase directly to the gaseous phase without melting is called sublimation.

在冬天,人们经常把洗了的衣服挂在屋外,而湿的衣服会结冰。僵硬的衣服则会逐渐地变干,因为冰会变成气体直接蒸发掉。白色



的樟脑球在我们放到箱子里之前很大。但是几个月以后,箱子里的樟脑球会变得越来越小,直至最后消失。但是我们可以感觉到衣服上樟脑的气味。这些樟脑球去哪儿了呢?事实上,樟脑球中的萘已经直接从固体状态变成了气态。这种由固态直接变成气态度没有融化的过程叫做升华。



In the contrary, it is not unusual to discover a change from the gaseous phase directly to the solid phase. For example, frost is rather commonly seen in winter. There are

actually fine crystalline ice deposited directly from the vapor in the air. A change from the gaseous phase directly back to the solid phase is also called sublimation.



相反,发现由气态直接变成固态的转变是常见的。例如,霜在冬天是常见的。这些水晶的冰是空气中的水气直接沉积而成的。从气态直接变成固态的变化过程也叫做

升华。

The typical experiment to observe the phenomenon of sublimation is



to heat solid iodine in a flask. By giving a little heat to the flask, we can see some violet gas produced from the solid iodine, and when we stop heating, we can see some iodine crystals condensed on the wall of the flask. This is the sublimation of iodine.



典型的观察升华现象的实验就是给在烧瓶里的固体碘加热。给烧瓶加一点热，我们会看见紫色的气体从固体碘上升起。当我们停止加热会发现，碘的结晶附着到烧瓶壁上。这就是碘的升华。

Experiments show that a certain amount of heat will be absorbed or released during the process of sublimation of a substance. Therefore, in the process of production, we often utilize the characteristic of sublimation to absorb heat to get a low temperature. For example, in the food industry, we often make use of the sublimation process of the solid carbon dioxide to absorb heat so as to freeze food in the storage.

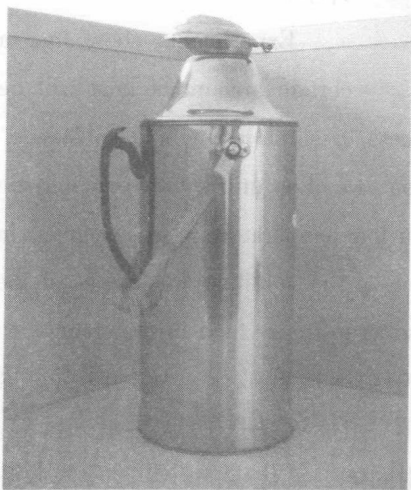
实验表明在物质升华的过程中会吸收或放出一定的热量。因此，在生产过程中，我们经常利用升华的特性——吸收热量来降温。例如，在食品工业中，我们经常利用固体二氧化碳的升华过程吸收热量，来使贮存库中的食物冻结。



To Slow Down and Limit Heat Transfer

减慢和限制热量传递

A thermos flask used in our daily life is a typical example of slowing down the transference of heat. It is a container made of two glass walls



with inner surfaces silver-coated and with a vacuum space in between. The bottle is plugged by a cork. The hot water filled in the bottle can be kept warm for a long time because the glass walls and the cork stopper conduct very little heat. The vacuum space in between the glass walls prevents the heat circulation. In addition, the silver-coated inner surfaces of the glass walls reflect back the heat ra-

diated from inside or from outside so that the loss of radiating heat is minimized. In this way, the heat preservation is achieved by means of full avoidance of all the three forms of heat transfer. In industry, people often use thermos flasks to preserve liquid nitrogen, dry ice (solid carbon dioxide) and other cooling agents.



我们日常生活中使用的保温瓶是减慢热量传递的典型例子。它是由两层内表面覆盖银镀层的玻璃墙组成的容器,两层玻璃墙之间被抽成真空,瓶口塞上软木塞。由于玻璃墙和软木塞的热量传递非常少,因此注入瓶中的热水可以保温很长时间。在



玻璃墙之间的真空可以防止热量的对流。另外,在玻璃墙上的银镀层可以反射来自里面或外面的热量辐射,从而将热辐射降低到最小。



通过采用避免热量传递的三种途径的方法保存了热量。在工业中,人们通常采用保温瓶来存液态氨、干冰(固态二氧化碳)和其他制冷剂。

The snow covering the wheat fields like a cotton quilt protects the wheat seedlings from being injured by frost. It is because the snow has little ability either to conduct or to radiate heat, and the air is also a poor heat conductor. Therefore, the heat in the soil cannot be dissipated easily, keeping the wheat seedling warm and growing well.



覆盖在麦田上的雪像棉被一样保护麦苗免受霜冻的损害,因为雪传导和辐射热量的能力很差,空气是热的不良导体。因此在土壤中的热量不容易散发,从而保持麦苗的温度和正常生长。



In winter, people are fond of wearing a down-padded coat. It is quite soft and warm. Fine down and the air in the porous space are poor heat conductors. Down itself cannot provide the body with any heat, but it prevents the body heat from escaping through the coat. In our daily life everywhere we can see many effective ways used to

slow down and limit the heat transfer.

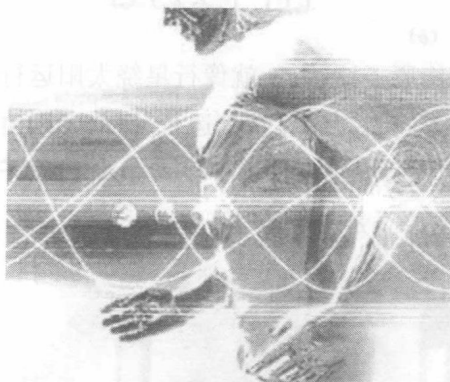
在冬天,人们爱穿羽绒服,它柔软暖和。良好的羽绒和在其中的空气都是热的不良导体。羽绒本身不能给身体提供热量,但它可以防止身体的热量通过衣服而散发。在我们的日常生活中,有效地减慢和限制热量传递的方法随处可见。



Static Electricity

静电

When a plastic ruler has been rubbed against wool, it will attract

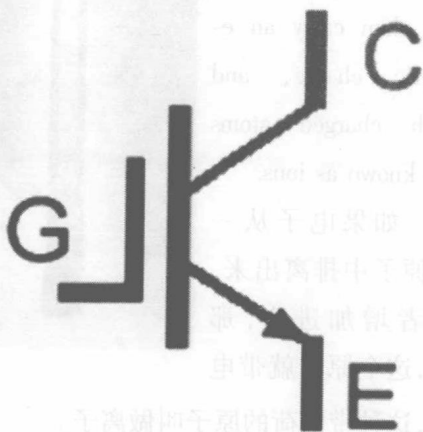


small pieces of paper. To explain why this takes place, we must refer to our knowledge of the electrical balance of the atom.

当我们用呢绒摩擦一把塑料尺时,这把塑料尺可以吸住一些小碎纸片。要解释为

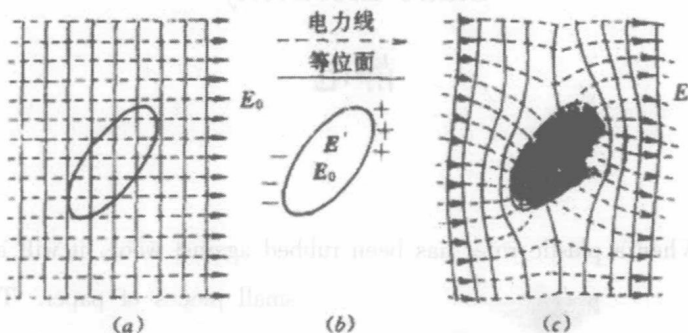
什么会产生这种现象,我们需要参考有关原子电平衡的知识。

As explained previously, electrons orbit the nucleus, just as planets orbit the sun. But there is a difference; the latter maintain their orbits by gravitational attraction, whereas the former maintain their orbits by





electrical attraction, since unlike charges attract each other (i. e. the negative charge of the electron is attracted by the positive charge of the proton), thus making the whole atom electrically neutral.

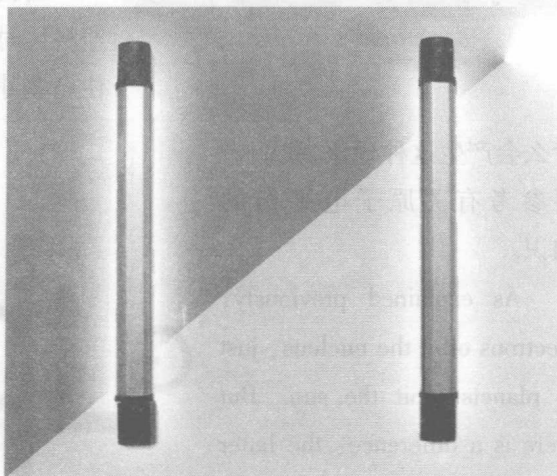


正如以前解释过的,电子围绕原子核运行,就像行星绕太阳运行一般。然而不同的是:后者由于万有引力而保持其运行,而前者则由于静电引力而保持其运行。由于异电相吸(即电子的负电荷被质子的正电荷吸引),使得一个完整的原子是中性的。

But if electrons are removed from, or added to, an atom, it will then carry an electric charge, and such charged atoms are known as ions.

如果电子从一个原子中排离出来,或者增加进去,那么,这个原子就带电

荷,这种带电荷的原子叫做离子。



The simplest method of achieving this is by friction. Electrons are

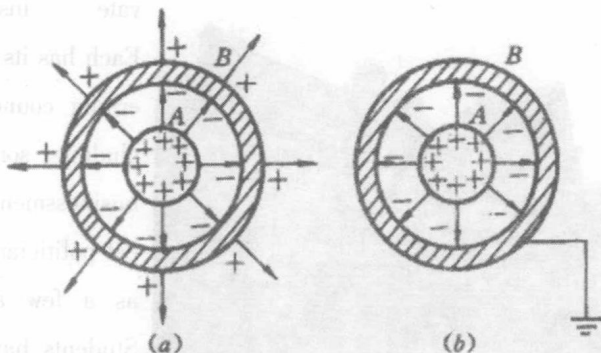


dislodged from the atoms of the plastic ruler, leaving them with too few, and thus carrying a positive charge. Electrons are added to the atoms of the wool, thus giving them a negative charge.

要做到这一点的最简便的方法就是摩擦。电子从塑料尺内的原子中逸出,所剩无几,因而塑料尺带有正电荷,加入呢绒中的原子的电子则为其提供了负电荷。

In this way we have got an electric charge. An electric charge made in this way is known as static electricity.

这样就可获得电荷。通过这种方式产生的电荷叫作静电。





British Universities: Cambridge and Oxford

英国的大学——剑桥与牛津

There are more than forty universities in Britain. They are all private institutions.

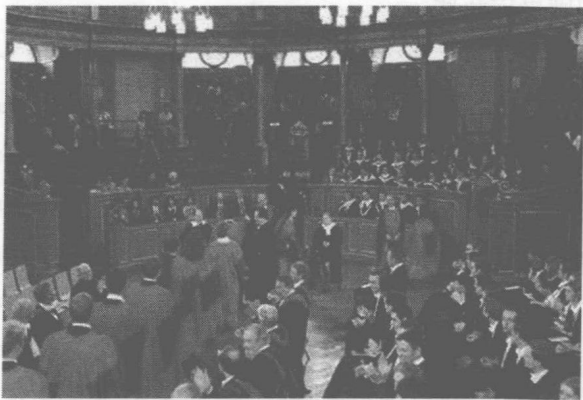
Each has its own governing council, including some local businessmen and local politicians as well as a few academics. Students have to pay fees and living

costs, but every student may receive from the local authority of the place where he lives a personal grant which is enough to pay his full costs, including lodging and food.





英国有四十多所大学,均为私立学校。每个学校有一个自己的管理委员会,它由当地的商人、政治家和一些学者组成。学生们需要付学费和生活费,但每位学生都能从他所生活地区的当局,得到一份能付清食宿等所有费用的个人补助金。



Each university has its own syllabuses , and there are some quite important differences between one and another. In general the Bachelor's



degree is given to students who pass examinations at the end of three or four years of study. Bachelors' degrees are at two levels, Honours and Pass . In some cases the Honours degree is given for intensive study and examination in one, two or three related subjects while the Pass degree may be somewhat broader.

每个学校都有自己的教学大纲,而且有时会很不相同。一般来说,学生经过三到四年的学习并通过考试之后,就可以拿到学士学位。而学士学位又分两种:优秀和及格,前者一般授予在一门或二、