

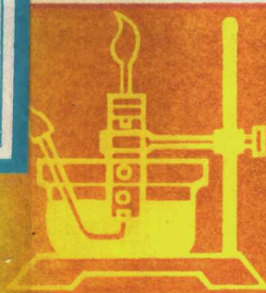
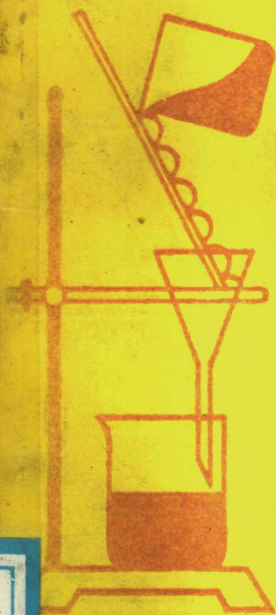
化学小知识

周道礼

SMALL
KNOWLEDGE
IN
CHEMISTRY

福建教育出版社

中学生英语入门读物



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中学生英语简易读物
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前 言

化学是自然科学中的一门基础学科。为了扩展青少年尤其是中学生的化学知识面，开拓其思维能力，特选编若干化学小知识，汇集成册，供读者选读。基于外国语是对外联系，沟通中外文化、科学技术的重要工具，本书用英文撰写，旨在帮助读者初步打下阅读化学专业英文书籍的基础。为方便读者阅读，每篇文后附有：(1) 化学专业词语的汉语译文和英语读音国际音标；(2) 对正文若干句子的注释，包括对科学知识的注释和英语语法的注释。

本书属英文简易读物，它取材广泛，内容涉及生产、生活、科学研究中的某些化学现象以及首届全国青年化学竞赛中部分实验现象的解释，并有机地联系物理、生物、天体、海洋、气象、火箭等有关知识。

由于水平限制，书中缺点、错误在所难免。热诚欢迎读者批评指正。

编 者

一九八六年十一月

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Gold and Silver (1)

Gold and silver are called noble metals. You have already known the diamond necklace in your senior lesson. But do you know gold may be also used to compose a necklace? That is partially based on the reason gold looks as pretty as diamond.

Gold is a bright yellow metal because it reflects light partially. Some jewelery contains gold for its beautiful colours and luster.⁽²⁾ It may be hammered into the sheet only 0.00001 cm thick. It also may be drawn into the wire that weighs only 0.0005g per meter. Very thin sheet of gold is blue or green.

In most cases pure gold is too soft to be used, it is always turned with copper⁽³⁾, silver or other metals into alloys⁽³⁾. Of course, the gold copper alloys are redder and harder than pure gold.

The purity of gold in its alloy is usually expressed in carats⁽⁵⁾. Pure gold is considered as 24 carats fine. Therefore, the number in carats of the gold is the parts in 24 parts of the metal. For example, the alloy of the gold necklace of 18 carats is only 18/24 pure for gold.

Gold is chemically inactive. It can't react with air and water. This is why gold is always used as a jewe-

lery.

Silver is a white metal. It is the best conductor⁽⁶⁾ of electricity and heat. As gold, silver may also be drawn into the wire so fine that one meter weighs only 0.0167 g. Similar to gold, silver is an inactive metal. But it slowly reacts with sulfur⁽⁷⁾ to form silver sulfide⁽⁸⁾.

Silver is sometimes used on jewelry as gold.

Both gold and silver are used for coinage⁽⁹⁾ in some countries.

Silver can react with nitric acid⁽¹⁰⁾, but gold can't. Gold may be separate from silver in their alloy by such process.

New words and expressions

- (1) silver ['silvə] n. 银
- (2) luster ['lʌstə] n. 光泽
- (3) copper ['kɒpə] n. 铜
- (4) alloy ['æloi] n. 合金
- (5) carat ['kærət] n. 开 (表示金的成色或纯度)
- (6) conductor [kən'dʌktə] n. 导体
- (7) sulfur ['sʌlfə] n. 硫
- (8) silver ['silvə] sulfide ['sʌlfaid] 硫化银
- (9) coinage ['kɔɪnɪdʒ] n. 铸造钱币
- (10) nitric ['nɪtrɪk] acid ['æsɪd] 硝酸

Notes to the text

1. You have already known the diamond necklace in your senior lesson.

在高中课程里你已经懂得了钻石项链。

见全日制学校高中英语课本第1册第26页。原文题为：

THE LOST NECKLACE

2. That is partially based on the reason gold looks as pretty as diamond.

这里 that 指原文里上一句的 gold may be also used to compose a necklace, 意思是金子所以也能用来制项链, 部分原因是它和钻石一样美观。这里从句 gold looks as pretty as diamond 即表示主句中的 reason, 是它的同位语从句。

3. Gold is a bright yellow metal because it reflects light partially.

金是一种黄色的光亮金属, 因为它把光线部分反射出来。

副词 partially 修饰动词 reflects。当白光照射在金上面, 波长较短的蓝光和紫光被它吸收, 而橙、黄等色光被反射出来, 因而金显黄色。

4. Pure gold is considered as 24 carats fine. Therefore, the number in carats of the gold is the parts in 24 parts of the metal.

我们把纯金定为24开。因此一块金的开数就是在24份的金属中, 它所占的份数。例如 22 开金的纯度应

是22/24.

5. Silver can react with nitric acid, but gold can't.

银会溶于硝酸，而金不会。

溶解金必须用王水（浓硝酸和浓盐酸按1:3摩尔比混和）。

The Combustion of Magnesium⁽¹⁾

If you want to take a photograph in a dark room, you must have a photoflash⁽²⁾ on the camera⁽³⁾. Why can a photoflash send out such a bright light? Because it contains some flashlight powder. Flashlight powder is a mixture of magnesium powder and barium peroxide⁽⁴⁾ (BaO_2) or potassium chlorate⁽⁵⁾ (KClO_3). When the flashpowder is burned by the electric current, the following reaction will take place.



Because a lot of energy is liberated in this process, a quite bright light will be sent out. The appliance of flashlight in photograph is one of the uses of the burning of magnesium. With the bright shining on the burning of magnesium, it is used in the flare bomb⁽⁶⁾ in army also. As there is plenty of heat liberated in the reaction, magnesium is used in burning bomb in war. But in some cases now, aluminium⁽⁷⁾ is used instead of it.

One of the chief uses of magnesium is in the alloy with aluminum. The magnesium aluminum alloy containing magnesium from 8 to 25 per cent are lighter, harder, stronger and more easily machined than aluminum alone. It is mainly used in the plane industry. Other magnesium_m

aluminum alloy possibly contains a little copper.

Magnesium is a silvery-white metal. But it always looks somewhat darker, because its surface has been turned to magnesium oxide(MgO). Magnesium is one of the light metals.

Magnesium is chemically rather an active metal. Although it can't react with cold water, easily it reacts with water at 100°C however. The reaction may be described as



The solution formed in the reaction above will be red when phenolphthalein® is dropped in. It tells us that the solution is alkaline®.

New words and expressions

(1) the combustion [kəm'bastʃəm] of magnesium
[mæg'ni:ziəm] 镁的燃烧

(2) photoflash [ˈfəʊtəʃlæʃ] n. 闪光灯 (用于照相机上)

(3) camera [ˈkæməɾə] n. 照相机

(4) barium [ˈbæəriəm] peroxide [pə'roksaɪd] 过氧化钡

(5) potassium [pə'tæsiəm] chlorate [klo:'reɪt] 氯酸钾

(6) flare [flæ] bomb [bɒm] 照明弹

(7) aluminum [ə'ljʊ:mɪnəm] n. 铝

(8) phenolphthalein [fi:nɔl'fθæliin] n. 酚酞

(9) alkaline ['ælkəlaɪn] a. 碱性的

Notes to the text

1. Flashlight powder is a mixture of magnesium powder and barium peroxide or potassium chlorate.

闪光粉是镁和过氧化钡或氯酸钾的混合物。

介词短语 of magnesium powder and barium peroxide or ... 用作定语修饰 a mixture.

2. Because a lot of energy is liberated in this process, a quite bright light will be sent out.

由于反应过程释放出大量的能量,而发出耀眼的亮光。另一方面镁的燃烧过程中,除发出强光外,同时还放出大量热量。这里光能和热能都来自化学能的转化。

3. With the bright shining on the burning of magnesium, it is used in the flare bomb in army also.

镁燃烧时闪耀着亮光,因此在军事上可用作照明弹的原材料。

介词短语 with the bright shining on the burning of magnesium 用作状语修饰谓语动词 is used. flare bomb 也可写作 light bomb, 意思都指照明弹。

4. The magnesium aluminum alloy containing magnesium from 8 to 25 per cent are lighter, harder, stronger and more easily machined than aluminum alone.

含8—25%镁的镁铝合金比纯铝轻、硬、强度较大并且易于加工。

分词短语 containing magnesium from 8 to 25 per cent 用作定语修饰主语 The magnesium aluminum alloy.

[注] 近年来一些国家出版的词典上把国际音标的符号[ou]改作[eu]。鉴于国内目前通用的英汉词典仍作[ou]，为便于读者查阅词典，本书注音时也沿用音符[ou]。本文中的 photoflash 读音为[ˈfoulɛflæʃ]下文同此，如go注为[gou]。

Mercury⁽¹⁾ and Thermometer⁽²⁾

Mercury is the only liquid in all of metals at ordinary temperature. If there is a thermometer on your desk, you will know the temperature at any moment. The mercury in the tube⁽³⁾ of the thermometer is observed rising up every morning. And it will fall down in the evening. Why does it act in such a way? Because the temperature in a room at day time is generally higher than that at night.

The cubic coefficient of expansion⁽⁴⁾ of mercury keeps almost constantly ($\beta = 1.8006 \times 10^{-4} + 2 \times 10^{-8} t^{\circ}$) between 0° and 300°C . The pure liquid does not "wet" glass. Because of these reasons above, mercury is extensively used in thermometers.

In order to make a mercury thermometer, we may blow a bulb⁽⁵⁾ at one end of a piece of thick-walled glass tube with a small uniform diameter. Then we fill the bulb and tube with mercury much enough for measuring the highest temperature we need. At last we may seal off⁽⁶⁾ the tube in a hot flame⁽⁷⁾. After cooling, the mercury will contract and fall down from the top of the tube leaving a vacuum⁽⁸⁾ above it.



Fig 1

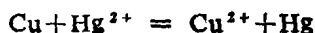


Fig 2

Now we must find out the 0°C point of the thermometer. For this aim, we may hand the thermometer into melting ice as indicated in Fig 1. The place where the mercury standing now is the 0°C point. Then we may mark it. In order to find out the 100°C point, we further place the thermometer into the steam rising from boiling water as indicated in Fig 2. The new position of the mercury in the tube now may be marked 100°C . The space between 0° and 100° point may be then divided into 100 equal parts. Surely each part equals to 1°C . Of course, the divisions of the same length on the tube may be extended above the 100°C point and below the 0°C point.

Because mercury turns to solid state at -39°C , the mercury thermometer can't be used below that temperature. Under this or much lower temperature, alcohol⁽⁹⁾ thermometer should be used instead of it. Alcohol turns to solid state only below -130°C . Similarly, since mercury turns to gaseous state at 360°C , mercury thermometer cant' be used over very high temperature.

Mercury is chemically rather an inactive metal. In the order of the activity of metals its place is behind copper. If mercuric nitrate⁽¹⁰⁾ solution is dropped on a copper plate for a moment, a trace mark of it will be left on the plate quickly. The following reaction would have been completed.



New words and expressions

- (1) mercury ['mæ:kjuri] n. 汞, 也称水银
- (2) thermometer [θə'mɒmɪtə] n. 温度计
- (3) tube [tju:b] n. 管子
- (4) the cubic ['kju:bɪk] coefficient [kəʊlɪ'fɪʃənt]
of expansion [ɪks'pænjən] 体膨胀系数
- (5) bulb [bʌlb] n. 球状物 (泡)
- (6) seal [si:l] off 封闭
- (7) a hot flame [fleɪm] 高温火焰
- (8) vacuum ['vækjuəm] n. 真空
- (9) alcohol ['ælkəhɒl] n. 酒精
- (10) mercuric [mæ:'kjʊərɪk] nitrate ['naɪtreɪt]
硝酸汞

Notes to the text

1. Mercury is the only liquid in all of metals at ordinary temperature.