上海科技英汉双解化学词典

朱崇业 译

SSTP

English-Chinese Bilingual
Dictionary of Chemistry

上海科学技术出版社


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absolute zero the lowest temperature theoretically possible, zero degrees kelvin, equivalent to −273.16℃/−459.67 °F, at which molecules are motionless. Although the third law of ◊ thermodynamics indicates the impossibility of reaching absolute zero exactly, a temperature within 3×10^{-8} kelvin of it was produced in 1984 by Finnish scientists. Near absolute zero, the physical properties of some materials change substantially; for example, some metals lose their electrical resistance and become superconductive.

绝对零度 从热力学第二定律引入的热力学(◊ thermodynamics)温标上的最低温度,0K 相当于−273.16℃/−459.67 °F;在这个温度下,所有分子都不运动。尽管热力学第三定律提出了绝对零度是不可能达到的,但人们可以尽量接近它,1984 年芬兰科学家获得 3×10^{-8}K 的低温。近于绝对零度时,某些材料的物理性质会发生质的变化,例如,有些金属失去了它们的电阻,出现超导现象。

acetate common name for ◊ ethanoate.

醋酸盐 通常命名为乙酸盐(◊ ethanoate)。

acetic acid common name for ◊ ethanoic acid.

醋酸 通常命名为乙酸(◊ ethanoic acid)。

acetone common name for ◊ propanone.

丙酮 (◊ propanone)。

acetylene common name for ◊ ethyne.
乙炔 (◊ ethyne)。

acid compound that releases hydrogen ions in the presence of water. The presence of water is essential; acidity is a property of dilute acids. The three most common acids used in the laboratory are sulphuric acid (H_2SO_4), hydrochloric acid (HCl) and nitric acid (HNO_3). These are sometimes referred to as the mineral acids. An acid can also be defined as a proton donor.

$$HCl_{(g)} + aq \leftrightarrow H^+_{(aq)} + Cl^-_{(aq)}$$

The reactions of acids are the reations of the $H^+_{(aq)}$ ion. These are as follows.

with indicators They give a specific colour reaction with indicators; for example, litmus turns red.

with alkalis They react to form a salt and water (neutralization).

$$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O$$

with carbonates With carbonates and hydrogencarbonates, acids form a salt and displace carbon dioxide.

$$HNO_3 + NaHCO_3 \rightarrow NaNO_3 + CO_2 + H_2O$$

with metals Acids react with metals to give off hydrogen and form a salt.

$$Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$$

Acids react with many ◊ bases, such as oxides and hydroxides, but the product is not always soluble in water so the reaction soon ceases, as when sulphuric acid reacts with calcium oxide, hydroxide, or carbonate.

Acids can be classified according to their basicity (the number of hydrogen atoms available to react with a base) and degree of ionization

(how many of the available hydrogen atoms dissociate in water). Dilute sulphuric acid is classified as a strong (highly ionized), dibasic acid.

Most naturally occurring acids are found as organic compounds, such as the fatty acids R-COOH and sulphonic acids $R\text{-}SO_3H$, where R is an organic molecular structure.

酸 在水的作用下,释放出质子的化合物,水的存在是必不可少条件下。稀酸具有酸性。在实验室中最常用的三种酸是硫酸(H_2SO_4)、盐酸(HCl)和硝酸(HNO_3),它们通常称为无机酸。酸同样可看作是质子给体。

$$HCl_{(g)} + aq \leftrightarrow H^+_{(aq)} + Cl^-_{(aq)}$$

酸反应大多数是氢离子(水中)反应,这些反应如下所述。

和指示剂反应 与指示剂反应显示出特殊的颜色,例如,使紫色石蕊变成红色。

和碱反应 反应生成盐和水(即中和反应)。

$$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O$$

和碳酸盐反应 酸与碳酸盐和碳酸氢盐反应,形成盐,并释放出二氧化碳。

$$HNO_3 + NaHCO_3 \rightarrow NaNO_3 + CO_2 + H_2O$$

和金属反应 酸与金属反应,逸出氢气,并生成盐。

$$Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$$

酸能和许多碱性化合物(◊ bases)如氧化物和氢氧化物反应,但是,产物并非全能溶于水,因此反应不久就停止了,硫酸和氧化钙、氢氧化钙或者碳酸钙反应就是如此。

酸能按其碱度(指能与碱反应的氢原子数)或电离度(在水中可能解离的氢原子数目)进行分类。稀硫酸被称为强(高电离)的二元酸。

大多数存在于自然界的酸为有机化合物,例如脂肪酸 R—COOH 和磺酸 $R\text{—}SO_3H$,这里的 R 代表一个有机分子的基团。

acidic oxide oxide of a ◊ non-metal. Acidic oxides are covalent compounds. Those that dissolve in water, such as sulphur dioxide, give acidic solutions.

$$SO_2 + H_2O \leftrightarrow H_2SO_{3(aq)} \leftrightarrow H^+_{(aq)} + HSO^-_{3(aq)}$$

All acidic oxides react with alkalis to form salts.

$$CO_2 + NaOH \rightarrow NaHCO_3$$

酸性氧化物 非金属(◊ non-metal)氧化物。酸性氧化物是共价化合物。酸性氧化物如二氧化硫溶于水后,成为酸性溶液。

$$SO_2 + H_2O \leftrightarrow H_2SO_{3(aq)} \leftrightarrow H^+_{(aq)} + HSO^-_{3(aq)}$$

所有酸性氧化物与碱反应生成盐。

$$CO_2 + NaOH \rightarrow NaHCO_3$$

acid rain rain with a pH less than 5, thought to be caused principally by the release into the atmosphere of sulphur dioxide (SO_2) and oxides of nitrogen. Sulphur dioxide is formed from the burning of fossil fuels such as coal that contain high quantities of sulphur, and nitrogen oxides are contributed from industrial activities and car exhaust fumes.

Acid rain is linked with damage to and death of forests and lake organisms in Scandinavia, Europe, and eastern North America. It also results in damage to plants and buildings.

酸雨 pH 小于 5 的雨;主要是由释放到大气中的氮氧化物和二氧化硫(SO_2)引起的。二氧化硫来源于矿物燃料的燃烧,例如燃烧含硫较高的煤;而氮氧化物来源于工业生产和小汽车排出的尾气。

酸雨的危害性已和斯堪得纳维亚、欧洲和北美东部的森林毁坏、湖泊中生物的死亡联系在一起。酸雨也导致农作物和建筑物的损坏。

acid salt compound formed by the partial neutralization of a dibasic or tribasic ◇ acid. Although a salt, it contains replaceable hydrogen, so it may undergo the typical reactions of an acid. Examples are sodium hydrogen sulphate ($NaHSO_4$) and acid phosphates.

酸式盐 二元酸或者三元酸(◇ acid)部分中和后所形成的化合物,虽是一个盐,但它含有可取代的氢,所以它可以像酸那样进行各种化学反应,硫酸氢钠($NaHSO_4$)和酸式磷酸盐就是这样的酸式盐。

actinide any of a series of 15 radioactive metallic chemical elements with atomic numbers 89 (actinium) to 103 (lawrencium).

锕系元素 从原子序数 89(锕)到 103(铹)共 15 种具有放射性的元素的统称,它们组成一个系列。

activation energy the energy required to start a chemical reaction. Some elements and compounds will react together merely by bringing them into contact (spontaneous reaction). For others it is necessary to supply energy in order to start the reaction, even if there is ultimately a net output of energy. This initial energy is the activation energy.

The ◇ energy of reaction denotes the net change in energy for the reaction as represented by a chemical equation, and does not include the activation energy.

活化能 该能量为启动一个化学反应所必需的能量。某些元素和化合物只要它们碰在一起就会发生反应(自发反应)。另一些元素和化合物必须提供能量才能启动反应,即使这个反应最终为放热反应。这个激发反应进行的能量就是活化能。

反应能(◇ energy of reaction)表示该反应能量的净变化,它可标注在一个化学方程式后,这个反应能不包括活化能。

activity series alternative name for ◇ reactivity series.

活度(顺)序 又称为反应序列(◇ reactivity series)。

addition polymerization ◇ polymerization reaction in which a single monomer gives rise to a single polymer, with no other reaction products.

加成聚合 是以一种单体通过聚合(◇ polymerization)反应,生成单一的聚合物,且没有其他的反应产物。

addition reaction reaction in which the atoms of an element or compound react with a double or triple bond in an organic compound by opening up one of the bonds and becoming attached to it, as when hydrogen chloride reacts with ethene to give chloroethane.

$$CH_2{=}CH_2 + HCl \rightarrow CH_3CH_2Cl$$

An example is the addition of hydrogen atoms to ◇ unsaturated compounds in vegetable oils to produce margarine.

加成反应 一元素或者化合物的原子和另一个含有双键或叁键的有机物反应,通过反应,有机物的不饱和键打开,和原子连接起来,如氯化氢和乙烯反应生成氯乙烷。

$$CH_2{=}CH_2 + HCl \rightarrow CH_3CH_2Cl$$

氢原子加成到植物油中不饱和化合物(◇ unsaturated compounds)上,而生成人造奶油就是一个例子。

adhesive substance that sticks two surfaces together. Natural adhesives include gelatin in its crude industrial form (made from bones, hide fragments and fish offal) and vegetable gums. Synthetic adhesives include thermoplastic and thermosetting resins, which are often stronger than the substances they join; mixtures of epoxy resin and hardener that set by chemical reaction; and elastomeric (stretching) adhesives for flexible joints.

粘合剂 将两个表面粘结在一起的物质。天然粘合剂包括按粗加工方

式制成的明胶(由骨头、兽皮碎片和鱼下水制成)和植物性树胶。合成粘合剂包括热塑性和热固性的树脂,它们的强度常大于被粘物的强度。合成粘合剂还包括环氧树脂和通过化学反应而生成的固化剂的混合物,以及用于柔韧接缝的弹性粘合剂。

aerated water water that has had air (oxygen) blown through it. Such water supports aquatic life and prevents the growth of bacteria.

充氧水 该水中已通入空气(氧气),这种水能维持水生物的生长,并能阻止细菌繁殖。

aerial oxidation reaction in which air is used to oxidize another substance, as in the contact process for the manufacure of sulphuric acid, and in the ◊ souring of wine.

$$2SO_2 + O_2 \leftrightarrow 2SO_3$$

空气氧化 在该反应中,空气用于氧化另一种物质。这个反应用于接触法生产硫酸,也用于酒的发酵(◊ souring)。

$$2SO_2 + O_2 \leftrightarrow 2SO_3$$

affinity force of attraction (see ◊ bond) between chemical elements, which helps to keep them in combination in a molecule. A given element may have a greater affinity for one particular element than for another (for example, hydrogen has a great affinity for chlorine, with which it easily and rapidly combines to form hydrochloric acid, but has little or no affinity for argon).

亲合力 化学元素间的吸引力(见键(◊ bond)),该力帮助这些元素结合成一个分子。某一个给定的元素,与另一个元素间的亲合力,可能比它与其他元素的亲合力要大(例如,氢与氯具有较大的亲合力,它很快与氯结合生成氯化氢,而它与氩却几乎没有亲合力)。

air see ◇atmosphere.

空气 见大气(◇atmosphere)。

air pollution contamination of the atmosphere caused by the discharge, accidental or deliberate, of a wide range of toxic substances. Often the amount of the released substance is relatively high in a certain locality, so the harmful effects are more noticeable. The cost of preventing any discharge of pollutants into the air is prohibitive, so attempts are more usually made to reduce gradually the amount of discharge and to disperse this as quickly as possible by using a very tall chimney, or by intermittent release.

空气污染 大气污染是由于在很大范围内因事故或者故意排放出有害物质而引起的。在某些局部地区,排放物的量是相对较高的,所以其危害作用尤其明显。阻止污染物排放到空气中的费用是难以估价的,逐渐地减少排放物的量和用非常高的烟囱尽可能快地分散排放物,或者断断续续地释放排放物均是常用的防污染方法。

alcohol any member of a group of organic chemical compounds characterized by the presence of one or more OH (hydroxyl) groups in the molecule, and which form ◇esters with acids. The main uses of alcohols are as solvents for gums and resins; in lacquers and varnishes; in the making of dyes; for essential oils in perfumery; and for medical substances in pharmacy. Alcohol (ethanol) is produced naturally in the ◇fermentation process and is consumed as part of alcoholic beverages.

Alcohols may be liquids or solids, according to the size and complexity of the molecule. The five simplest alcohols form a series in which the number of carbon and hydrogen atoms increases progressively, each one having an extra CH_2(methyl) group in the molecule: methanol or wood spirit (methyl alcohol, CH_3OH); ethanol (ethyl alcohol, C_2H_5OH); propanol (propyl alcohol, C_3H_7OH); butanol (butyl alcohol,

C_4H_9OH); and pentanol (amyl alcohol, $C_5H_{11}OH$). The lower alcohols are liquids that mix with water; the higher alcohols, such as pentanol, are oily liquids not miscible with water, and the highest are waxy solids – for example, hexadecanol (cetyl alcohol, $C_{16}H_{33}OH$) and melissyl alcohol ($C_{30}H_{61}OH$), which occur in sperm-whale oil and beeswax respectively.

醇 在分子中有一个或多个羟基—OH 存在的一类有机化合物均称为醇，它与酸反应生成酯(◊ esters)。醇的主要用途：在树胶、树脂、油漆和清漆中作为溶剂；在染料生产中用作溶剂；在香料行业中作为香精油的溶剂；在制药业中作为药物的溶剂。醇(乙醇)通常是用发酵(◊ fermentation)过程生产的，部分醇用于酒类饮料业。

根据分子的复杂性和大小，醇可以是液体或固体。五个最简单的醇形成一个系列。在该系列中，碳、氢原子数目逐渐增加，各个醇分子之间相差一个或几个 CH_2(亚甲基)：甲醇或木醇(CH_3OH)；乙醇(C_2H_5OH)；丙醇(C_3H_7OH)；丁醇(C_4H_9OH)；和戊醇($C_5H_{11}OH$)。低级醇是液体，能溶于水；中级醇，如戊醇，为油状液体，难以与水混和；而高级醇是蜡状固体，例如十六(烷)醇(鲸蜡基醇，$C_{16}H_{33}OH$)和蜂花醇($C_{30}H_{61}OH$)，它们分别存在于巨头鲸油和蜂蜡中。

alcoholic solution solution produced when a solute is dissolved in ethanol.

醇溶液 当一溶质溶解在乙醇中所生成的溶液称之为醇溶液。

aldehyde any of a group of organic chemical compounds prepared by oxidation of primary alcohols, so that the OH (hydroxyl) group loses its hydrogen to give an oxygen joined by a double bond to a carbon atom (the aldehyde group, –CHO).

The name is made up from alcohol dehydrogenation, that is, alcohol from which hydrogen has been removed. Aldehydes are usually liquids and include methanal, ethanal, benzaldehyde, and citral.

醛 用伯醇氧化制得的一类有机化合物。伯醇中的—OH(羟基)失去

氢后，使氧原子和碳原子以双键形式结合(醛基—CHO)。

它由相应的醇来命名，因为醛是醇脱氢构成的，也就是醇中的氢被消去。醛通常是液态的，它们包括甲醛，乙醛，苯甲醛和柠檬醛。

aliphatic compound any organic compound that is made up of chains of carbon atoms, rather than rings, as in ◊ cyclic compounds. The chains may be linear, as in hexane (C_6H_{14}), or branched, as in 2-propanol (isopropanol) $(CH_3)_2CHOH$.

脂肪族化合物 由数个碳原子构成的链状有机化合物，它不具有环状化合物(◊ cyclic compounds)那种环状链。该链可能是直线型的，如正己烷(C_6H_{14})；或是有支链的，如异丙醇[$(CH_3)_2CHOH$]。

alkali water-soluble ◊ base. The four main alkalis are sodium hydroxide (caustic soda, NaOH); potassium hydroxide (caustic potash, KOH); calcium hydroxide (slaked lime or limewater, $Ca(OH)_2$); and aqueous ammonia ($NH_{3(aq)}$). Their solutions all contain the hydroxide ion OH^-, which gives them a characteristic set of properties.

with indicators Alkalis give a specific colour reaction with indicators; for example, litmus turns blue.

with acids They react with acids to form a salt and water (neutralization).

$$KOH + HNO_3 \rightarrow KNO_3 + H_2O$$

$$OH^- + H^+ \rightarrow H_2O$$

with ammonium salts Alkalis displace ammonia gas from ammonium salts.

$$NH_4Cl + NaOH \rightarrow NaCl + NH_3 + H_2O$$

$$NH^+_{4(a)} + OH^-_{(aq)} \rightarrow NH_{3(g)} + H_2O$$

with soluble salts Alkalis precipitate the insoluble hydroxides of most metals from soluble salts.

$$FeCl_2 + 2NaOH \rightarrow Fe(OH)_2 + 2NaCl$$

$$Fe^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Fe(OH)_{2(s)}$$

碱 水溶性的碱(◇ base)。四种主要的碱是氢氧化钠(苛性钠,NaOH),氢氧化钾(苛性钾,KOH),氢氧化钙(消石灰或者石灰水,$Ca(OH)_2$),和氨水($NH_{3(aq)}$)。它们的溶液都含有氢氧根离子 OH^-,该离子具有一系列特性。

和指示剂作用 碱和指示剂反应呈现特殊的颜色,例如使石蕊溶液变蓝。

和酸反应 碱和酸反应生成盐和水(中和反应)。

$$KOH + HNO_3 \rightarrow KNO_3 + H_2O$$

$$OH^- + H^+ \rightarrow H_2O$$

和铵盐作用 碱从铵盐中置换出氨气。

$$NH_4Cl + NaOH \rightarrow NaCl + NH_3 + H_2O$$

$$NH^+_{4(s)} + OH^-_{(aq)} \rightarrow NH_{3(g)} + H_2O$$

和可溶性盐反应 碱从可溶性盐中沉淀出大多数不溶性的金属氢氧化物。

$$FeCl_2 + 2NaOH \rightarrow Fe(OH)_2 + 2NaCl$$

$$Fe^{2+}_{(aq)} + 2OH^-_{(aq)} \rightarrow Fe(OH)_{2(s)}$$

alkali metal any of a group of six metallic elements with similar bonding properties: lithium, sodium, potassium, rubidium, caesium, and francium. They form a linked group (group Ⅰ) in the ◇ periodic table of the elements. They are univalent and of very low density (lithium,

sodium, and potassium float on water); in general they are reactive, soft, low-melting-point metals. Because of their reactivity they are only found as compounds in nature, and are used as chemical reactants rather than as structural metals.

碱金属 具有相似成键性质的 6 个元素：锂、钠、钾、铷、铯和钫。它们在元素周期表(◊ periodic table of the elements)中形成一个相关的族(第Ⅰ族)。它们是+1 价的，并且密度非常小(锂、钠和钾飘浮在水中)；通常情况下它们是非常活泼的、硬度小的、熔点低的金属。因为它们很高化学活性，自然界中只以化合物形式存在，并且，它们常用作化学反应物，而不是作为结构型金属。

alkaline-earth metal any of a group of six metallic elements with similar bonding properties: beryllium, magnesium, calcium, strontium, barium, and radium. They form a linked group (group Ⅱ) in the ◊ periodic table. They are strongly basic, bivalent, and occur in nature only as compounds.

碱土金属 具有相似的成键性质的 6 个金属元素：铍、镁、钙、锶、钡和镭。它们在周期表(◊ periodic table)中形成一个相关的族(第Ⅱ族)。它们是强碱性的，呈+2 价；在自然界中仅以化合物形式存在。

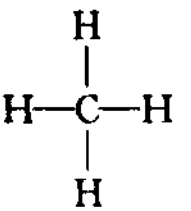
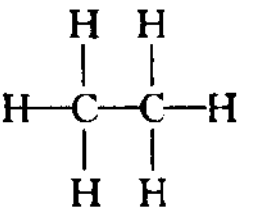
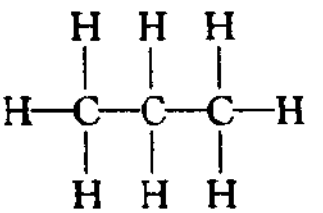
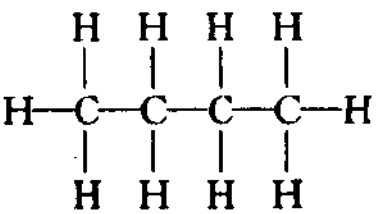
alkane member of the group of ◊ hydrocarbons having the general formula C_nH_{2n+2} (common name ***paraffins***). Lighter alkanes are colourless gases (for example, methane, ethane, propane, butane); in nature they are found dissolved in petroleum. Heavier ones are liquids or solids. As they contain only single ◊ covalent bonds, they are said to be saturated.

Their principle reactions are combustion and bromination.

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

$$C_2H_6 + Br_2 \xrightarrow{200℃} C_2H_5Br + HBr$$

alkane 烷烃

name 命名	*molecular formula* 分子式	*structural formula* 结构式
methane 甲烷	CH_4	
uses: *domestic fuel* (*natural gas*) 用途:民用燃料(天然气)		
ethane 乙烷	C_2H_6	
uses: *industrial fuel and chemical feedstock* 用途:工业燃料和化工原料		
propane 丙烷	C_3H_8	
uses: *bottled gas* (*camping gas*) 用途:瓶装液化气(液化气)		
butane 丁烷	C_4H_{10}	
uses: *bottled gas* (*lighter fuel*, *camping gas*) 用途:瓶装液化气(轻燃料、液化气)		