



# 世界最新 英汉双解无机化学词典

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The Facts On File  
Dictionary of Inorganic Chemistry

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The Facts On File Dictionary of Inorganic Chemistry

John Daintith

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## 世界最新英汉双解无机化学词典

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# 译者序

本词典内容涉及无机化学基本概念、元素及其重要无机化合物的基本知识,并扩展到分析化学、有机化学和物理化学领域的一些基本词汇和在这些领域作出过重要贡献的人物的简介词条。附录中列出了所有化学元素并附有元素周期表,同时还提供了一些有帮助的网页和参考文献。本词典词条释意准确、文字叙述简明、通俗。

词典的词目按英文字母顺序编排。词条采用双语形式释义,可作为大学生、中学教师和从事本专业的工作者进行双语教学、专业文献阅读使用。

参与本词典翻译工作的还有李珺、李淑妮、王飞利、郝志峰、张荣兰、任颜卫和苏碧云等,朱刚、刘玉颖、隋爱香、惠赉、杨莉宁及郭惠等参与了译校工作。词典在翻译过程中得到了西北大学吕余刚、陕西师范大学张国防及世界图书出版西安公司王佳编辑的热情支持和帮助。在此向他们表示衷心感谢!

由于译者水平有限,错误、疏漏之处在所难免,恳请读者批评、指正。

译者

2007 年 6 月于西北大学

# 凡 例

1. 本词典所收录词条内容涵盖无机化学基本概念、元素及其重要无机化合物的基本知识,并扩展到分析化学、有机化学和物理化学领域的一些基本词汇和在这些领域作出过重要贡献的人物简介的词条。

2. 本词典是根据 The Facts On File Dictionary of Inorganic Chemistry 翻译而来,为了使读者能够同时学习两种语言,我们特将原版英文部分经授权体现在该词典的译版中。本词典的编排方式为英汉双解,采用双栏排版,左栏为英文原文,右栏为相应的中文部分。

3. 英文首词条和相应的中文首词条的字体均采用黑体,解释部分的字体均采用白体。若英文首词条有缩略语,则该缩略语置于英文首词条后面的括号中,中文首词条后的括号中也加入相应缩略语,例如:

**Atomic force microscope**(AFM)... **原子力显微镜**(AFM).....

英文术语的其他名称置于英文首词条后面的括号中,中文的相应名称也置于中文首词条后的括号中,例如:

**Alkali metal**(group 1 elements)... **碱金属**(第1族元素).....

4. 内容的排列顺序以英文部分首词的英文拼法顺序排列,首词后面括号中的缩略语及其他名称不参加排序。

5. 词条的解释:

① 如整体释义分层次解释的,则列小标题讲解,以突出不同梯度的知识点,例如:

<b>Atom</b> ...	1. ...	<b>原子</b> .....	1. ....
	2. ...		2. ....

3. ...

3. ....

② 词汇中一般出现的人名不予翻译,但已被多数人认可的则列出对应中文。

③ 英文中的斜体、大小写均同原版图书保持一致。

④ 有些词条需对照其他词条,则列出要参阅(比较)的词条,并且中文部分标出参阅(比较)的词条所在页码以便读者查阅。例如:

**absorption**... *compare* adsorption.    吸收作用……比较 12 页 adsorption。

**absorption spectrum**... *see* spectrum.    吸收光谱……参阅 552 页 spectrum。

6. 在行文中,译者对原文有歧意之处均在行文中用译注的方式标出。如:第 11 页第 3 行。

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# A

**AAS** See atomic absorption spectroscopy.

**absolute temperature** Symbol:  $T$  A temperature defined by the relationship:

$$T = \theta + 273.15$$

where  $\theta$  is the Celsius temperature. The absolute scale of temperature was a fundamental scale based on Charles' law applied to an ideal gas:

$$V = V_0(1 + \alpha\theta)$$

where  $V$  is the volume at temperature  $\theta$ ,  $V_0$  the volume at 0, and  $\alpha$  the thermal expansivity of the gas. At low pressures, when real gases show ideal behavior,  $\alpha$  has the value  $1/273.15$ . Therefore, at  $\theta = -273.15$  the volume of the gas theoretically becomes zero. In practice, of course, substances become solids at these temperatures. Nevertheless, the extrapolation can be used to create a scale of temperature on which  $-273.15$  degrees Celsius ( $^{\circ}\text{C}$ ) corresponds to zero ( $0^{\circ}$ ). This scale was also known as the *ideal-gas scale*; on it temperature interval units were called *degrees absolute* ( $^{\circ}\text{A}$ ) or *degrees Kelvin* ( $^{\circ}\text{K}$ ), and were equal in size to the Celsius degree. It can be shown that the absolute temperature scale is identical to the THERMODYNAMIC TEMPERATURE scale, on which the temperature interval unit is the kelvin.

**原子吸收光谱** 参阅 45 页 atomic absorption spectroscopy.

**绝对温度** 符号:  $T$  由关系式  $T = \theta + 273.15$  定义的温度。

式中  $\theta$  是摄氏温度。绝对温标是基于查尔斯定律应用理想气体的基本温标

$$V = V_0(1 + \alpha\theta)$$

式中  $V$  是  $\theta^{\circ}\text{C}$  下的体积,  $V_0$  是  $0^{\circ}\text{C}$  下的体积,  $\alpha$  是气体的热膨胀系数。在低压条件下, 当实际气体显示理想行为时,  $\alpha$  值为  $1/273.15$ 。因此, 在  $\theta = -273.15^{\circ}\text{C}$  时, 气体体积理论上为 0。实际上, 物质在此温度时变为固体。不过, 可用外推的方法建立温标, 将其上的  $-273.15^{\circ}\text{C}$  当作零 ( $0^{\circ}$ )。该温标也叫理想气体温标; 其温度间隔的单位被叫作绝对度 ( $^{\circ}\text{A}$ ) 或开氏度 ( $^{\circ}\text{K}$ ), 间隔大小等同于摄氏度。可以看出, 绝对温标等同于热力学温标, 温度间隔单位为开尔文。

**absolute zero** The zero value of thermodynamic temperature; 0 Kelvin or  $-273.15$  degrees Celsius.

**绝对零度** 热力学温度中的 0 度;  $0^{\circ}\text{K}$  或  $-273.15^{\circ}\text{C}$ .

**absorption** A process in which a gas is taken up by a liquid or solid, or in which a liquid is taken up by a solid. In absorption, the substance absorbed goes into the bulk of the absorbing material. Solids that absorb gases or liquids often have a porous structure. The absorption of gases in solids is sometimes called *sorption*. Compare *adsorption*.

**吸收作用** 液体或固体吸收气体, 或固体吸收液体的过程。在吸收过程中, 被吸收的物质进入吸收材料体中。吸收液体或气体的固体物质通常具有多孔结构。固体对气体的吸收有时被称作吸着作用。比较 12 页 *adsorption*。

**absorption indicator** (adsorption indicator) An indicator used for titrations that involve a precipitation reaction. The method depends upon the fact that at the equivalence point there is a change in the nature of the ions absorbed by the precipitate particles. Fluorescein – a fluorescent compound – is commonly used. For example, in the titration of sodium chloride solution with added silver nitrate, silver chloride is precipitated. Sodium ions and chloride ions are absorbed in the precipitate. At the end point, silver ions and nitrate ions are in slight excess and silver ions are then absorbed. If fluorescein is present, negative fluorescein ions absorb in preference to nitrate ions, producing a pink complex.

**吸收指示剂** (吸附指示剂) 用于沉淀滴定的指示剂。这种方法的依据是, 被吸附在沉淀颗粒上的离子在等当点 (译注: 化学计量点) 时发生性质上的变化。荧光素是一种广泛应用的荧光物质。例如用硝酸银溶液滴定氯化钠溶液, 沉淀出氯化银。沉淀上吸附着钠离子和氯离子。在滴定终点, 银离子和硝酸根离子稍有过量且银离子被吸附。如果荧光素存在, 带负电荷的荧光素离子优先于硝酸根离子被吸附, 产生粉红色的配合物。

**absorption spectrum** See spectrum.

**吸收光谱** 参阅 552 页 *spectrum*。

**abundance** 1. The relative amount of a given element among others; for example, the abundance of oxygen in the Earth's crust is approximately 50% by mass.

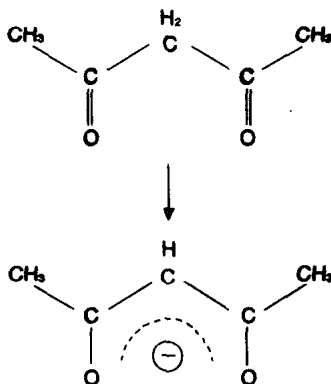
**丰度** 1. 给定元素在其他元素中的相对量, 例如按质量计氧在地壳中的丰度约为 50%。

2. 在给定样品中, 与相同元素的其他种核素有关的一种核素 (稳



2. The amount of a nuclide (stable or radioactive) relative to other nuclides of the same element in a given sample. The *natural abundance* is the abundance of a nuclide as it occurs in nature. For instance, chlorine has two stable isotopes of masses 35 and 37. The abundance of  $^{35}\text{Cl}$  is 75.5% and that of  $^{37}\text{Cl}$  is 24.5%. For some elements the abundance of a particular nuclide depends on the source.

**acac** Abbreviation for the bidentate *acetylacetonato* ligand, derived from acetylacetone ( $\text{CH}_3\text{COCH}_2\text{COCH}_3$ ).



**Acac:** the bidentate acetylacetonato ligand formed from a diketone

**Acac:** 由二酮形成的二齿乙酰丙酮基配体

**accelerator** A CATALYST added to increase the rate at which a chemical reaction occurs.

**acceptor** The atom or group to which a pair of electrons is donated in a coordinate bond. Pi-acceptors are compounds or groups that accept electrons into pi, p or d orbitals.

定的或放射性的) 的量。天然丰度是指某核素存在于自然界的一种核素的丰度。例如氯有质量数分别为 35 和 37 的两种稳定同位素。 $^{35}\text{Cl}$  的丰度是 75.5%,  $^{37}\text{Cl}$  的丰度是 24.5%。对某些元素而言, 特定核素的丰度随来源不同而定。

**acac** 二(双)齿乙酰丙酮基配体的缩写, 由乙酰丙酮( $\text{CH}_3\text{COCH}_2\text{COCH}_3$ )衍生物而来。

**加速剂** 增加化学反应速率的一种催化剂。

**受体** 在配位键中接受一对电子的原子或基团。 $\pi$  受体是用  $\pi$  轨道、p 轨道或 d 轨道接受电子的化合物或基团。

**accumulator** (secondary cell; storage battery) An electric cell or battery that can be charged by passing an electric current through it. Because the chemical reaction in the cell is reversible, current passed through it in the opposite direction to which it supplies current will convert the reaction products back into their original forms. The most common example is the lead-acid battery used in automobiles and other vehicles powered by internal combustion engines.

**acetate** See ethanoate.

**acetic acid** See ethanoic acid.

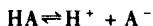
**acetylacetonato** See acac.

**acetylene** See ethyne.

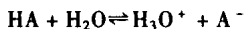
**Acheson process** See carbon

**achiral** Describing a molecule that does not exhibit optical activity. See chirality.

**acid** A substance that contains hydrogen and dissociates in solution to give hydrogen ions:



More accurately, the hydrogen ion is solvated (a hydroxonium ion):



*Strong acids* are completely dissociated in water. Examples are sulfuric acid and trichloroethanoic acid. *Weak acids* are only partially dissociated. Most organic carboxylic acids are weak acids. In distinction to an acid, a *base* is a compound that produces hy-

蓄电池(次级电池,蓄电瓶) 电流通过时可以充电的电池或电瓶。因为电池中的化学反应是可逆的,与电池所提供的电流方向相反的电通过电池时,可将反应产物转化为初始形态。最常见的例子是用于汽车和以内燃机驱动的其他车辆中的铅酸电池。

**醋酸盐** 参阅 221 页 ethanoate。

**醋酸** 参阅 222 页 ethanoic acid。

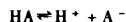
**乙炔丙酮基** 参阅 3 页 acac。

**乙炔** 参阅 223 页 ethyne。

**阿切孙法** 参阅 108 页 carbon。

**非手性的** 描述没有旋光性的分子。参阅 130 页 chirality。

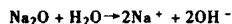
**酸** 含有氢并在溶液中解离出氢离子的物质:



更准确地说,氢离子是溶剂化合物(水合氢离子):

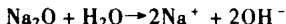


强酸在水中完全解离,例如硫酸和三氯乙酸。弱酸只是部分解离,大部分有机酸都是弱酸。与酸不同,碱是在水中能产生氢氧根离子的化合物。碱或是离子型的氢氧化物(如 NaOH),或是在水中形成氢氧根离子的化合物。后者可能是金属氧化物,例如:

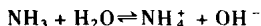


氨、胺和其他一些含氮化合物也能

dioxide ions in water. Bases are either ionic hydroxides (e.g. NaOH) or compounds that form hydroxide ions in water. These may be metal oxides, for example:



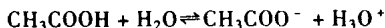
Ammonia, amines, and other nitrogenous compounds can also form  $\text{OH}^-$  ions in water:



As with acids, *strong bases* are completely dissociated; *weak bases* are partially dissociated.

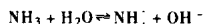
This idea of acids and bases is known as the *Arrhenius theory* (named for the Swedish physical chemist Svante August Arrhenius (1859 – 1927)).

In 1923 the Arrhenius idea of acids and bases was extended by the British chemist Thomas Martin Lowry (1874 – 1936) and, independently, by the Danish physical chemist Johannes Nicolaus Brønsted (1879 – 1947). In the *Lowry – Brønsted theory* an acid is a compound that can donate a proton and a base is a compound that can accept a proton. Proton donors are called *Brønsted acids* (or *protic acids*) and proton acceptors are called *Brønsted bases*. For example, in the reaction:



the  $\text{CH}_3\text{COOH}$  is the acid, donating a proton  $\text{H}^+$  to the water molecule. The water is the base because it accepts the proton. In the reverse reaction, the  $\text{H}_3\text{O}^+$  ion is the acid, donating a proton to the base  $\text{CH}_3\text{COO}^-$ . If two species are related by loss or gain of a proton they are described as *conjugate*. So, in this example,  $\text{CH}_3\text{COO}^-$  is the *conjugate base* of the acid  $\text{CH}_3\text{COOH}$  and  $\text{CH}_3\text{COOH}$  is the *conjugate acid* of the base  $\text{CH}_3\text{COO}^-$ .

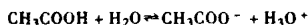
在水中形成  $\text{OH}^-$  离子:



与酸一样,强碱完全解离,弱碱部分解离。

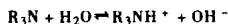
这种酸碱概念被称作阿累尼乌斯理论(以瑞典物理化学家 Svante August Arrhenius (1859—1927) 的名字命名)。

英国化学家 Thomas Martin Lowry (1874—1936) 和丹麦物理化学家 Johannes Nicolaus Brønsted (1879—1947) 于 1923 年各自独立地扩展了阿累尼乌斯的酸碱概念。在劳瑞—布朗斯特理论中,提供质子的化合物叫酸,接受质子的化合物叫碱。将质子给予体称为布朗斯特酸(或质子酸),将质子接受体称为布朗斯特碱。例如在下列反应中:



$\text{CH}_3\text{COOH}$  是酸,提供一个质子( $\text{H}^+$ )给水分子。水是碱,因为它接受了一个质子。在逆反应中, $\text{H}_3\text{O}^+$  是酸,提供一个质子给碱( $\text{CH}_3\text{COO}^-$ )。如果两个物种因得失一个质子而相互有关,则将这两个物种称为共轭(关系)。在这个例子中, $\text{CH}_3\text{COO}^-$  是  $\text{CH}_3\text{COOH}$  的共轭碱,而  $\text{CH}_3\text{COOH}$  是  $\text{CH}_3\text{COO}^-$  的共轭酸。

例如胺在水中的反应:



$\text{R}_3\text{N}$  从水分子中接受了一个质子,因此为碱, $\text{R}_3\text{NH}^+$  是它的共轭酸。水提供给  $\text{R}_3\text{N}$  一个质子,在此种情况下水是酸( $\text{H}_3\text{O}^+$  是它的共轭碱)。注意,根据反应环境的不同,水既可以作为酸,又可以作为碱。它可以接受一个质子(从  $\text{CH}_3\text{COOH}$  中),也可以提供一个质子(给  $\text{R}_3\text{N}$ )。这种化合物被称作两性化合物。

劳瑞—布朗斯特理论的一个重要特点是,因为它牵涉质子转移,所以反应不一定非要有水参与。可以用来描述类似液氨这样的非水溶液的酸碱反应。

In a reaction of an amine in water, for example:



The amine  $\text{R}_3\text{N}$  accepts a proton from water and is therefore acting as a base.  $\text{R}_3\text{NH}^+$  is its conjugate acid. Water donates the proton to the  $\text{R}_3\text{N}$  and, in this case, water is acting as an acid ( $\text{H}_3\text{O}^+$  is its conjugate base). Note that water can act as both an acid and a base depending on the circumstances. It can accept a proton (from  $\text{CH}_3\text{COOH}$ ) and donate a proton (to  $\text{R}_3\text{N}$ ). Compounds of this type are described as *amphiprotic*.

One important aspect of the Lowry - Brønsted theory is that, because it involves proton transfers, it does not necessarily have to involve water. It is possible to describe reactions in nonaqueous solvents, such as liquid ammonia, in terms of acid - base reactions.

A further generalization of the idea of acids and bases was the *Lewis theory* put forward, also in 1923, by the US physical chemist Gilbert Newton Lewis (1875 - 1946). In this, an acid (a *Lewis acid*) is a compound that can accept a pair of electrons and a base (a *Lewis base*) is one that donates a pair of electrons.

**acid-base indicator** An indicator that is either a weak base or a weak acid and whose dissociated and undissociated forms differ markedly in color. The color change must occur within a narrow pH range. Examples are METHYL ORANGE and PHENOLPHTHALEIN.

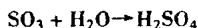
在 1923 年, 美国物理化学家 Gilbert Newton Lewis (1875—1946) 提出了路易斯理论, 该理论进一步扩展了酸和碱的概念。在路易斯理论中, 把接受电子对的化合物叫酸 (路易斯酸), 把提供电子对的化合物叫碱 (路易斯碱)。

**酸 - 碱指示剂** 这种指示剂是一种弱酸或一种弱碱, 其解离形式和非解离形式具有明显不同的颜色, 而且颜色的变化必须发生在一个很窄的 pH 范围内, 例如甲基橙和酚酞。

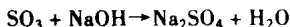
**acidic** Having a tendency to release a proton or to accept an electron pair from a donor. In aqueous solutions the pH is a measure of the acidity, i.e. an acidic solution is one in which the concentration of  $\text{H}_3\text{O}^+$  exceeds that in pure water at the same temperature; i.e. the pH is lower than 7. A pH of 7 is regarded as being neutral.

**acidic hydrogen** A hydrogen atom in a molecule that enters into a dissociation equilibrium when the molecule is dissolved in a solvent. For example, in ethanoic acid ( $\text{CH}_3\text{COOH}$ ) the acidic hydrogen is the one on the carboxyl group,  $-\text{COOH}$ .

**acidic oxide** An oxide of a nonmetal that reacts with water to produce an acid or with a base to produce a salt and water. For example, sulfur (VI) oxide (sulfur trioxide) reacts with water to form sulfuric acid:



and with sodium hydroxide to produce sodium sulfate and water:



See also amphoteric; basic oxide.

**acidic salt** See acid salt.

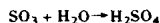
**acidimetry** A volumetric analysis or acid-base titration in which a standard solution of an acid is gradually added to the unknown (base) solution containing an indicator. In the converse procedure, *alkalimetry*, the standard solution is of a base and the unknown solution is acidic.

**acidity constant** See dissociation constant.

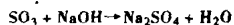
**酸性** 具有释放一个质子或接受给予体提供的一对电子的趋势。水溶液中的酸度用 pH 度量。即酸性溶液是  $\text{H}_3\text{O}^+$  浓度超过同一温度下纯水中  $\text{H}_3\text{O}^+$  浓度的溶液, 亦即 pH 小于 7 的溶液。pH 为 7 时被视为中性。

**酸性氢** 分子溶解在溶剂中时进入解离平衡的分子中氢原子。例如乙酸( $\text{CH}_3\text{COOH}$ )中的酸性氢是羧基( $-\text{COOH}$ )上的氢。

**酸性氧化物** 与水反应生成酸, 与碱反应生成盐和水, 的非金属氧化物。例如硫(VI)的氧化物(三氧化硫)与水反应生成硫酸:



与氢氧化钠反应生成硫酸钠和水:



参阅 31 页 amphoteric; 59 页 basic oxide.

**酸式盐** 参阅 8 页 acid salt.

**酸量滴定法** 容量分析法或酸碱滴定法。酸量滴定法中, 酸标准溶液被逐滴加入含有指示剂的未知(碱)溶液中。相反的过程, 叫碱量滴定法, 其标准溶液是碱, 未知溶液是酸。

**酸度常数** 参阅 191 页 dissociation constant.

**acid rain** See pollution.

**acid salt**(acidic salt) A salt in which there is only partial replacement of the acidic hydrogen of an acid by metal or other cations. For polybasic acids the formulae for such salts are of the type  $\text{NaHSO}_4$  (sodium hydrogensulfate) and  $\text{Na}_2\text{H}(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$  (sodium sesquicarbonate). For monobasic acids such as HF the acid salts are of the form  $\text{KHF}_2$  (potassium hydrogen difluoride). Although monobasic acid salts were at one time formulated as normal salts plus excess acid (i.e.  $\text{KF} \cdot \text{HF}$ ), it is preferable to treat them as hydrogen-bonded systems of the type  $\text{K}^+(\text{F}-\text{H}-\text{F})^-$ .

**actinic radiation** Radiation that can cause a chemical reaction; for example, ultraviolet radiation is actinic. See also photochemistry.

**actinides** See actinoids.

**actinium** A soft, silvery-white, highly radioactive metallic element of group 3 (formerly IIIB) of the periodic table. It is usually considered to be the first member of the ACTINOID series. It occurs in minute quantities in uranium ores as a result of the natural radioactive decay of  $^{235}\text{U}$ . The metal can be obtained by reducing  $\text{AcF}_3$  with lithium or it can be produced by bombarding radium with neutrons. It is used as a source of alpha particles and has also been used to generate thermoelectric power. The metal glows in the dark; it reacts with water to produce hydrogen.

**酸雨** 参阅 463 页 pollution.

**酸性盐(酸式盐)** 酸中的酸性氢仅有部分被金属离子或其他阳离子置换的盐。对多元酸而言,酸式盐的化学式有如  $\text{NaHSO}_4$ (硫酸氢钠)和  $\text{Na}_2\text{H}(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$ (碳酸氢三钠)。对一元酸而言,以 HF 为例,其酸式盐是  $\text{KHF}_2$ (氟化氢钾)。尽管一元酸的酸式盐一度曾被写作正盐与过量酸的加合物(如  $\text{KF} \cdot \text{HF}$ ),但用氢键体系  $\text{K}^+(\text{F}-\text{H}-\text{F})^-$  表示更可取。

**光化辐射** 能够引发化学反应的辐射,例如紫外辐射。参阅 453 页 photochemistry.

**锕系元素** 参阅 9 页 actinoids.

**锕** 周期表第 3 族(从前的 III B 族)中的一种质软、银白色的强放射性金属元素。它通常被看作锕系的第一个元素。锕作为  $^{235}\text{U}$  天然放射性衰变的产物以极少量存在于铀矿中。金属锕可用铈还原  $\text{AcF}_3$  或以中子轰击镅的方法获得。它被用作  $\alpha$  粒子源,也曾用于产生温差电源。金属锕在暗处发光,与水反应产生氢。

符号:Ac;熔点  $(1\,050 \pm 50)^\circ\text{C}$ ;沸点  $(3\,200 \pm 300)^\circ\text{C}$ ;相对密度 10.06( $20^\circ\text{C}$ );原子序数 89;最稳定同位素  $^{227}\text{Ac}$ (半衰期 21.77 年),其他同位素的半衰期非常短。

Symbol: Ac; m. p.  $1050 \pm 50^\circ\text{C}$ ; b. p.  $3200 \pm 300^\circ\text{C}$ ; r. d. 10.06 ( $20^\circ\text{C}$ ); p. n. 89; most stable isotope  $^{227}\text{Ac}$  (half-life 21.77 years); other isotopes have very short half-lives.

**actinoid contraction** The decrease in the atomic or ionic radius that occurs in the actinoids as the atomic number increases from actinium through nobelium. The increase in atomic number in the actinoids is associated with the filling of the inner 5f subshell. It is similar to the LANTHANOID CONTRACTION.

**actinoids (actinides)** A group of 15 radioactive elements whose electronic configurations display filling of the 5f level. As with the lanthanoids, the first member, actinium, has no f electrons ( $\text{Ac}[\text{Rn}]6d^17s^2$ ) but other members also show deviations from the smooth trend of f-electron filling expected from simple considerations, e. g. thorium  $\text{Th}[\text{Rn}]6d^27s^2$ , berkelium  $\text{Bk}[\text{Rn}]5f^66d^17s^2$ . The actinoids are all radioactive and their chemistry is often extremely difficult to study. The first eight, actinium, thorium, protactinium, uranium, neptunium, plutonium, americium, and curium occur naturally, although with the exception of thorium and uranium only in trace amounts. The others are generated by artificial methods using high-energy bombardment. See also transuranic elements.

**activated charcoal** See charcoal.

**activated complex** See transition state.

**铜系收缩** 铜系元素中从铜到镭原子或离子半径随原子序数增大而减小。原子序数的增加与5f内壳层的填充有关。其与镧系收缩类似。

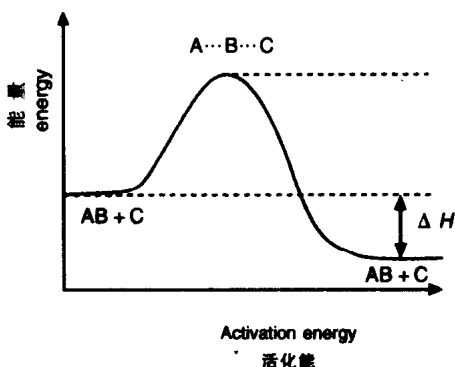
**铜系元素** 电子填充在5f亚层的15个放射性元素组成的一组元素。像镧系元素一样,铜系元素的第一个元素铜没有f电子( $\text{Ac}[\text{Rn}]6d^17s^2$ ),而且,其他元素也表现出偏离单纯期望的f-电子填充的平稳倾向。例如钍为 $[\text{Rn}]6d^27s^2$ ,镭为 $[\text{Rn}]5f^66d^17s^2$ 。铜系元素都是放射性元素,其化学性质很难进行研究。前8个元素:铜、钍、镤、铀、镎、钚、镅和镆天然地存在,除钍和铀外,其他6个元素仅以痕量存在。其余铜系元素都是用高能轰击的人工方法产生。参阅590页 transuranic elements。

**活性炭** 参阅125页 charcoal。

**活化配合物** 参阅589页 transition state。

**activated complex theory** A theory of chemical reactions in which the rate at which chemical reactions take place is related to the rate at which the *transition state* (activated complex) is converted into products. Activated complex theory is sometimes known as **TRANSITION STATE THEORY**. It was put forward by Henry Eyring in 1935.

**活化配合物理论** 化学反应的一种理论。这一理论认为, 化学反应的速率取决于过渡态(活化配合物)转化为产物的速率。活化配合物理论有时也称为过渡态理论。该理论是 Henry Eyring 于 1935 年提出的。



**activation energy** Symbol:  $E_a$ . The minimum energy that a particle, molecule, ion, etc. must acquire before it can react; i. e. the energy required to initiate a reaction regardless of whether the reaction is exothermic or endothermic. Activation energy is often represented as an energy barrier that must be overcome if a reaction is to take place. See Arrhenius equation.

**活化能** 符号:  $E_a$ . 粒子、分子或离子等能引发反应所必需的最小能量。即不论反应是放热还是吸热, 都需要一个引发反应的能量。活化能通常被看作反应发生时必须超越的能垒。参阅 38 页 Arrhenius equation.

**activator** See promoter.

**活化剂** 参阅 479 页 promoter.

**active mass** See mass action, law of.

**有效质量** 参阅 365 页 mass action, law of.



**activity** 1. Symbol:  $a$  A corrective concentration or pressure factor introduced into equations that describe real solvated systems. Certain thermodynamic properties of a solvated substance are dependent on its concentration (e.g. its tendency to react with other substances). Real substances show departures from ideal behavior and thus require such correction factors.

2. Symbol:  $A$  The average number of atoms disintegrating per unit time in a radioactive substance.

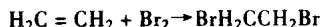
**activity coefficient** Symbol:  $f$  A measure of the degree of deviation from ideality of a solvated substance, defined as:

$$a = fc$$

where  $a$  is the activity and  $c$  the concentration. For an ideal solute  $f = 1$ ; for real systems  $f$  can be less or greater than unity.

**acyclic** Describing a compound that is not cyclic (i.e. a compound that does not contain a ring in its molecules).

**addition reaction** A reaction in which additional atoms or groups of atoms are introduced into an unsaturated organic compound, such as an alkene or ketone. A simple example is the addition of bromine across the double bond in ethene:



Addition reactions can be induced either by *electrophiles*, which are ions or molecules that are electron deficient and can therefore accept electrons, or by *nucleophiles*, which are ions or molecules that can donate electrons.

**活度** 1. 符号:  $a$  引入方程以描述实际溶剂化系统的校正的浓度或压力因子(译注:原文如此。根据通常理解,活度应该是有效浓度或有效压力,即校正浓度或校正压力;校正的浓度或压力因子意指活度系数)。溶剂化物质的某些热力学性质与它的浓度有关(如与其他物质发生反应的趋势)。实际物质表现出偏离理想状态的行为,因此需要这样的校正因子。

2. 符号:  $A$  放射性物质在单位时间内裂解的平均原子数。

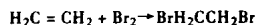
**活度系数** 符号:  $f$  用于衡量溶剂化物质偏离理想状态的程度。定义为:

$$a = fc$$

式中  $a$  为活度,  $c$  为浓度。对于理想状态的溶质,  $f = 1$ ; 对于实际体系,  $f$  可能小于或大于 1。

**脂肪族的** 用于描述非环化合物(分子中不含环结构的化合物)。

**加成反应** 向不饱和有机化合物,例如烯烃、酮中加入额外原子或原子团的反应。一个简单的例子是向乙烯的双键上加溴:



加成反应可以通过亲电试剂或亲核试剂来诱导。前者是缺电子的离子或分子,因而可接受电子;后者是可以提供电子的离子或分子。