Molar mass of potassium hydroxide

Potassium hydroxide Names IUPAC name Potassium hydroxide Other names Caustic Potash, Lee, Lee Potasa, Potassium, Potassium Hydrate, KOH CAS Identifiers Number 1310-58-3 and Model 3D (JSmol) Interactive image ChEBI CHEBI:32035 and ChemSpider 14113 AND ECHA InfoCard 100.013.802 EC Number 215-181-3 E number E525 (acidity regulators, ...) PubChem CID 14797 RTECS number TT2100000 UNII WZH3C48M4T AND number UN 1813 CompTox Dashboard (EPA) DTXSID5029633 InChI-1S/K.H2O/h;1H2/q+1 ; /p-1 YKey: KWYUFKZDYYNOTN-UHFFFAOYSA-M YInChI-1/K.H2O/h;1H2/q+1;/p-1Key: KWYUFKZDYYNOTN-REWHXWOFAT SMILES [K+]. [OH-] Properties Chemical formula KOH Molar mass 56.11 g mol−1 Appearance white solid, deliquescent Odor odorless Density 2.044 g/cm3 (20 °C)[1] 2.12 g/cm3 (25 °C)[2] Melting point 360[3] °C (680 °F; 633 K) Boiling point 1,327 °C (2,421 °F; 1,600 K) Solubility in water 85 g/100 mL (-23.2 °C) 97 g/100 mL (0 °C) 121 g/100 mL (25 °C) 138.3 g/100 mL (50 °C) 162.9 g/100 mL (100 °C)[1][4] Solubility soluble in alcohol, glycerol insoluble in ether, liquid ammonia Solubility in methanol 55 g/100 g (28 °C)[2] Solubility in isopropanol ~14 g / 100 g (28 °C) Basicity (pKb) −0.7[5] (KOH(aq) = K+ + OH–) Magnetic susceptibility (χ) −22.0·10−6 cm3/mol Refractive index (nD) 1.409 (20 °C) Structure Crystal structure rhombohedral Thermochemistry Heat capacity (C) 65.87 J/mol· K[2] Std molarentropy (So298) 79.32 J/mol K[2][6] Std enthalpy offormation (AfH⦵298) -425.8 kJ/mol[2][6] Gibbs free energy (6) Gibbs free energy -380.2 kJ/mol[2] Hazards Safety data sheet ICSC 0357 GHS pictograms [7] GHS Signal word Danger GHS hazard statements H302, H314[7] GHS precautionary statements P280, P305+351+338, P310[7] NFPA 704 (fire diamond) 0 3 0ALK Flash point Non-Lethal flammable dose or concentration (LD, LC): LD50 (median dose) 273 mg/kg (oral, rat)[9] NIOSH (US health exposure limits): PEL (Permissible) none[8] REL (Recommended) C 2 mg/m3[8] IDLH (Immediate danger) N.D.[8] Compounds Other anions Potassium hydrosulfidePotassium amide Other cations Lithium hydroxideSodium hydroxideRubidium hydroxideCaesium hydroxide Related compounds Potassium oxide Except where otherwise noted , data are given for materials in their standard state (at 25 'C [77 F], 100 kPa). N check (what is YN?) Infobox refers to potassium hydroxide is an inorganic compound with the KOH formula, and is commonly called caustic potash. Along with sodium hydroxide (NaOH), this colorless solid is a strong prototypical base. It has many industrial and niche applications, most of which exploit its caustic nature and reactivity to acids. It is estimated that between 700,000 and 800,000 tonnes were produced in 2005. KOH is notable as the precursor to most soft and liquid soaps, as well as numerous potassium-containing chemicals. It's a solid white that is Corrosive. More commercial are about 90% pure, the rest is water and carbonates. [10] Potassium hydroxide properties and structure are generally sold as translucent pellets, which become sticky in the air because KOH is hygroscopic. Therefore, KOH normally contains variable amounts of water (as well as carbonates - see below). Its dissolution in the water is strongly exothermic. Concentrated aqueous solutions are sometimes called potassium distances. Even at high temperatures, solid KOH does not dehydrate easily. [11] Structure at higher temperatures, solid KOH crystallizes in the crystalline NaCl structure. The OH group is disordered quickly or randomly so that the OH group is effectively a spherical anion of radius 1.53o (between Cl and F size). At room temperature, OH groups are ordered and the environment is distorted over K^+ centers, with distances K^+—OH, ranging from 2.69 to 3.15o, depending on the orientation of the OH group. KOH forms a number of crystalline carbohydrates, namely KOH monohydrate • H_2O, KOH dihydrate • $2H_2O$ and KOH tetrahydrate • $4H_2O$. [12] Thermal stability such as NaOH, KOH exhibits high thermal stability. The gaseous species is dimeric. Due to its high stability and relatively low melting point, it is often melted melting as pellets or rods, shapes that have low surface area and convenient handling properties. Reactions Basic properties, solubility and desiccants About 121 g of KOH are dissolved in 100 ml of water at room temperature, contrasting with 100 g/100 ml for NaOH. Therefore, on a molar basis, NaOH is slightly more soluble than KOH. Lower molecular weight alcohols such as methanol, ethanol and propanoles are also excellent solvents. They participate in an acid-base balance. In the case of methanol, potassium methoxide (methylate) is formed: [13] $KOH + CH_3OH$ ↽ , display ⇀, >> < $CH_3OK + H_2O$, due to its high affinity for water, KOH acts as a desiccant in the laboratory. It is often used to dry basic solvents, especially amines and pyridines. As a nucleophile in organic chemistry, KOH, like NaOH, serves as a source of OH, a highly nucleophilic anion that attacks polar bonds in inorganic and organic materials. SAPonifis KOH aqueous esters: $KOH + RCOOR' \rightarrow RCOOK + R'OH$ When R is a long chain, the product is called potassium soap. This reaction is manifested by koh's greasy feeling when touched: skin fats quickly turn into soap and glycerol. The molten KOH is used to displace halides and other groups of output sheets. The reaction is especially useful for aromatic reagents to provide the corresponding phenols. [14] Reactions with inorganic compounds Complementary to their reactivity to acids, KOH attacks Oxides. Therefore, SiO_2 is attacked by KOH to give soluble potassium silicates. KOH reacts with carbon dioxide to give bicarbonate: $KOH + CO_2 \rightarrow KHCO_3$ $KHCO_3$ Historically, KOH was made by adding potassium carbonate to a strong solution of calcium hydroxide (cal alakeada) The reaction of saline metathesis results in the precipitation of solid calcium carbonate, leaving potassium hydroxide in solution: $Ca(OH)_2 + K_2CO_3 \rightarrow CaCO_3 + 2 KOH$ Filtering of precipitated calcium carbonate and reducing potassium hydroxide solution (calcined or This method of potassium hydroxide production remained dominant until the end of the century XIX, when largely replaced by the current method of electrolysis potassium chloride solutions. [10] The method is analogous to the manufacture of sodium hydroxide (see chlorralkali process): $2 KCl + 2 H_2O \rightarrow$ 2 forms of $KOH + Cl_2 + H_2$ hydrogen gas as a by-product in the cathode; at the same time, anodic oxidation of chloride ion occurs, forming chlorine gas as a by-product. Separation of adodic and cathode spaces in the electrolysis cell is essential for this process. [15] It uses KOH and NaOH can be used interchangeably for a number of applications, although in the industry, NaOH is preferred due to its lower cost. Precursor of other potassium compounds Many potassium salts are prepared by neutralization reactions involving KOH. Potassium salts of carbonate, cyanide, permanganate, phosphate and various silicates are prepared by treating oxides or acids with KOH. [10] The high solubility of potassium phosphate is desirable in fertilizers. Soft soap manufacturing Fat saponification with KOH is used to prepare the corresponding potassium soaps, which are softer than the most common sodium hydroxide-derived soaps. Due to their softness and increased solubility, potassium soaps require less water to liquefy, and therefore may contain more cleaning agent than liquefied sodium soaps. [16] As an electrolytic potassium carbonate, formed from the hydroxide solution that is filtered from an alkaline battery Aqueous potassium hydroxide is used as the electrolyte in alkaline batteries based on nickel-cadmium, nickel-hydrogen, and manganese dioxide.zinc. Potassium hydroxide is preferred over sodium hydroxide because its solutions are more conductive. [17] Nickel-metal hydride batteries in the Toyota Prius use a mixture of potassium hydroxide and sodium hydroxide. [18] Nickel-iron batteries also use potassium hydroxide electrolyte. Food industry In food products, potassium hydroxide acts as a food thickener, pH control agent and food stabilizer. The FDA considers it (as a direct human food ingredient) as generally safe when combined with good manufacturing practice conditions. [19] He is known E-number system like E525. Niche applications Such as sodium hydroxide, potassium hydroxide attracts numerous specialized applications, virtually all of which depend on its properties as a strong chemical base with its consequent capacity degrade many materials. For example, in a process commonly known as chemical or rhesomic cremation, potassium hydroxide accelerates the breakdown of soft tissues, both animal and human, to leave behind only bones and other hard tissues. [20] Entomologists wishing to study the fine structure of insect anatomy can use a 10% KOH aqueous solution to apply this process. [21] In chemical synthesis, the choice between the use of KOH and the use of NaOH is guided by solubility or maintaining the quality of the resulting salt. The corrosive properties of potassium hydroxide make it a useful ingredient in agents and preparations that clean and disinfect surfaces and materials that can resist corrosion by KOH. [15] KOH is also used for the manufacture of semiconductor chips. See also: anisotropic wet engraving. Potassium hydroxide is often the main active ingredient in chemical cuticle removers used in manicure treatments. Because aggressive bases like KOH damage the cuticle of the hair stem, potassium hydroxide is used to chemically aid hair removal from animal skins. The skins are soaked for several hours in a SOLUTION of KOH and water to prepare them for the de-entallation stage of the tanning process. This same effect is also used to weaken human hair in preparation for shaving. Pre-shave products and some shaving creams contain potassium hydroxide to force the opening of the hair cuticle and act as a hygroscopic agent to attract and force water on the hair shaft, causing more damage to the hair. In this weakened state, the hair is cut more easily with a razor blade. Potassium hydroxide is used to identify some species of fungi. A 3-5% KOH aqueous solution is applied to the meat of a fungus and the researcher points out whether the color of the meat changes or not. Certain species of gill fungus, ballots, polypores and lichens[22] are identifiable on the basis of this color change reaction. [23] Safety potassium hydroxide and its solutions are serious irritants to the skin and other tissues. [24] See also Potash Soda lime Saltwater Soap – Sailor's Soap

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