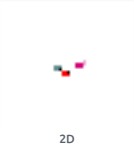
PubChem

COMPOUND SUMMARY

Potassium hydroxide

PubChem CID:	14797
Structure:	 2D Find Similar Structures
Chemical Safety:	 Corrosive Irritant Laboratory Chemical Safety Summary (LCSS) Datasheet
Molecular Formula:	KOH or HKO
Synonyms:	POTASSIUM HYDROXIDE Caustic potash 1310-58-3 Potash lye Potassium hydrate More...
Molecular Weight:	56.106 g/mol
Component Compounds:	CID 5462222 (Potassium) CID 962 (Water)
Dates:	Modify: 2020-02-26 Create: 2005-03-27

Potassium hydroxide, also known as *lye* is an inorganic compound with the chemical formula *KOH*. Also commonly referred to as *caustic potash*, it is a potent base that is marketed in several forms including pellets, flakes, and powders. It is used in various chemical, industrial and manufacturing applications. Potassium hydroxide is also a precursor to other potassium compounds. Potassium hydroxide is used in food to adjust pH, as a stabilizer, and as a thickening agent. This ingredient has been considered as generally safe as a direct human food ingredient by the FDA, based upon the observance of several good manufacturing practice conditions of use. In addition to the above uses, potassium hydroxide is also used in making soap, as an electrolyte in alkaline batteries and in electroplating, lithography, and paint and varnish removers. Liquid drain cleaners contain 25 to 36% of potassium hydroxide. Medically, potassium hydroxide (KOH) is widely used in the wet mount preparation of various clinical specimens for microscopic visualization of fungi and fungal elements in skin, hair, nails, and even vaginal secretions,. Recently, it has been studied for efficacy and tolerability in the treatment of warts. It was determined that topical KOH solution was found to be a safe and effective treatment of plane warts.

▸ DrugBank

Potassium hydroxide, solution appears as an clear aqueous solution. Corrosive to metals and tissue. Noncombustible. Used in chemical manufacturing, petroleum refining, cleaning compounds.

▸ CAMEO Chemicals

Potassium hydroxide is an alkali metal hydroxide.

▸ ChEBI

11 Safety and Hazards

11.1 Hazards Identification

11.1.1 GHS Classification

Showing 1 of 5 View More

Pictogram(s)	 Corrosive Irritant
Signal	Danger
GHS Hazard Statements	H302: Harmful if swallowed [Warning Acute toxicity, oral] H314: Causes severe skin burns and eye damage [Danger Skin corrosion/irritation]
Precautionary Statement Codes	P260, P264, P270, P280, P301+P312, P301+P330+P331, P303+P361+P353, P304+P340, P305+P351+P338, P310, P321, P330, P363, P405, and P501 (The corresponding statement to each P-code can be found at the GHS Classification page.)

EU REGULATION (EC) No 1272/2008

11.1.2 NFPA Hazard Classification

NFPA 704 Diamond	 3-0-1
NFPA Health Rating	3 - Materials that, under emergency conditions, can cause serious or permanent injury.
NFPA Fire Rating	0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
NFPA Instability Rating	1 - Materials that in themselves are normally stable but that can become unstable at elevated temperatures and pressures.

Occupational Safety and Health Administration (OSHA)

11.1.3 EPA Safer Chemical

Chemical: Potassium hydroxide

Green circle - The chemical has been verified to be of low concern based on experimental and modeled data.

EPA Safer Choice

11.1.4 Health Hazard

Causes severe burns of eyes, skin, and mucous membranes. (USCG, 1999)

U.S. Coast Guard. 1999. Chemical Hazard Response Information System (CHRIS) - Hazardous Chemical Data. Commandant Instruction 16465.12C. Washington, D.C.: U.S. Government Printing Office.

CAMEO Chemicals

11.1.5 Fire Hazard

Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]: Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.). Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. For electric vehicles or equipment, ERG Guide 147 (lithium ion batteries) or ERG Guide 138 (sodium batteries) should also be consulted. (ERG, 2016)

U.S. Department of Transportation, Transport Canada, and Secretariat of Communications and Transport of Mexico, with collaboration from Argentina's Centro de Información Química para Emergencias. 2016 Emergency Response Guidebook. https://www.phmsa.dot.gov/hazmat/outreach-training/erg (accessed April 26, 2016).

CAMEO Chemicals

Not combustible. Contact with moisture or water may generate sufficient heat to ignite combustible materials. Risk of fire and explosion on contact with incompatible substances. See Chemical Dangers.

ILO International Chemical Safety Cards (ICSC)

Corrosive, Reactive - 1st degree

NJDOH RTK Hazardous Substance List

11.1.6 Fire Potential

When wet, attacks metals such as aluminum, tin, lead & zinc to produce flammable hydrogen gas.

U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

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11.1.7 Skin, Eye, and Respiratory Irritations

Dust or mist /is/ irritating to eyes, nose & throat. ...

U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.

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12.1.10 Acute Effects

ChemIDplus

12.1.11 Toxicity Summary

No studies are currently identified regarding the reproduction/developmental toxicity of potassium hydroxide [L1955]. The Ld50 of potassium hydroxide in rats ranges from 0.273 - 1.230 g KOH/kg body weight/day [L1942]. Adverse effects include vomiting, diarrhea, skin blistering, gastrointestinal disturbance, and burns [L1945]. Strong alkaline chemicals such as potassium hydroxide destroy soft tissues may cause a deep, penetrating type of burn. Caustics are usually hydroxides of light metals. **Sodium hydroxide** and potassium hydroxide are the most broadly used caustic agents in the industry [L1952]. Potassium Hydroxide can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath [L1950].

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IDENTIFICATION AND USE: Potassium hydroxide (KOH) is commercialized as a solid or as solutions with varying concentrations. It is used in soap manufacture; drain and pipeline cleaners; bleaching agents; manufacture of **potassium carbonate** and **tetrapotassium pyrophosphate**, an electrolyte in alkaline storage batteries and some fuel cells, absorbent for **carbon dioxide** and **hydrogen sulfide**; dyestuffs; liquid fertilizers; food additive; herbicides; electroplating; mercerizing; and paint removers. HUMAN EXPOSURE AND TOXICITY: Potassium hydroxide causes direct local effects on the skin, eyes and gastrointestinal tract after direct exposure. If KOH aerosols/mists occur, they will cause direct local effects on respiratory tract. Solutions with concentrations higher than 2% are corrosive, while concentrations of about 0.5 to about 2.0 % are irritating. The irritant effects are reported as coughing, wheezing, conjunctivitis, tearing, and irritation. Children may be accidentally exposed to commercial cleaning products. In a retrospective clinical study with 168 children after alkaline substance ingestion, 9 children (5.3%) developed gastric outlet obstruction. The fatal complications from an alkaline battery foreign body (containing potassium hydroxide 45%) in the esophagus of a 2.5 year old male, resulting in corrosive burns of the esophagus, necrosis, perforation, communication between the esophagus and the trachea and subsequent death, is reported. A total of 23 burns of the eye due to NaOH or KOH were admitted to the eye clinic of the RWTH Aachen in Germany from 1985 to 1992. In 17 cases the accident happened during work, while 6 cases occurred at home using NaOH/KOH as drain cleaner. The alkali burns were of special interest because of the rapid and deep penetration of alkali into the ocular tissues. A 4-year old boy who had a button battery lodged in his nose for approx. 24 hrs had local tissue corrosion, with a small perforation, caused presumably by the 25% KOH electrolyte. An epidemiological study about potash mining workers failed to correlate the exposure to potash to a number of diseases evaluated, including lung cancer. However, there is also a strong association between lye stricture of the esophagus and esophageal squamous cell carcinoma, with a long latent period of eventually several decades. ANIMAL STUDIES: In an acute toxicity study for KOH, the LD50 (intubation) of male rats was 365 mg/kg. Hemorrhaging of the stomach and intestine and adhesions of abdominal organs (stomach, pancreas, spleen, liver and small intestine) were seen following administration of both lethal and sub-lethal doses. Surviving animals showed evidence of hyper excitability, followed by apathy and weakness throughout the 14-day post-exposure period. Other clinical signs were increased respiration rate, ruffled fur, eye closing and bloody nasal exudate. All deaths occurred within 72 hours of dosing. KOH has a moderate acute oral toxicity, which is essentially due to its corrosivity. The observed systemic effects could be regarded as secondary effects. Draize skin tests in rabbits, with gauze covering and application of 0.1 mL during 24 hours, qualified a 5% KOH solution as mildly irritating on intact skin and highly irritating on abraded skin. A 10% KOH solution was qualified as corrosive on both intact and abraded skin as the result of a Draize occlusive test on rabbits with 4 hours exposure to 0.5 mL of the solution. The results of an Ames assay study with Salmonella typhimurium TA 97 and TA 102, with and without metabolic activation and up to 1 mg KOH/plate, were negative. The clastogenic activity of KOH was studied in an in vitro chromosomal aberration test using Chinese hamster ovary (CHO) K1 cells. No clastogenic activity was found at KOH concentrations of 0, 8 and 12 mM, which corresponded with initial pH values of 7.3, 9.8 and 10.4, respectively. A long-term study (reliability 3) of 25-46 weeks, consisting of painting 3-6% KOH solutions on mouse skin, has been performed. The results were ca. 15% occurrence of cancer at the application site. An old long-term study (reliability 3) of 25-46 weeks, consisting of painting 3-6% KOH solutions on mouse skin, has been performed. The results were 15% occurrence of cancer at the application site. Doses of 2.35-235 mg/kg bw/day in mice and 3.1-310 mg/kg bw/day in rats were administered to groups of 21-24 animals by single daily oral intubation. Body weights were recorded during 17 days for mice, with a post exposure period of 2 days and during 20 days for rats, with a post exposure period of 5 days. No significant effects were observed on mice and rat's survival and reproductive organs, or on offspring survival, weight, sex ratio and congenital defects.

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12.1.12 Antidote and Emergency Treatment

Immediate first aid: Remove patient from contact with the material. Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing **water**. Do not induce vomiting. If vomiting occurs, lean patient forward or place on the left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Inorganic Bases/Alkaline Corrosives and Related Compounds/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3rd revised edition, Elsevier Mosby, St. Louis, MO 2007, p. 191

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Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer **oxygen** by nonrebreather mask at 6 to 12 L/min. Monitor for pulmonary edema and treat if necessary ... . Monitor for shock and treat if necessary ... . For eye contamination, flush eyes immediately with **water**. Irrigate each eye continuously with 0.9% saline (NS) during transport ... . Do not use emetics. For ingestion, rinse mouth and administer 5 mL/kg up to 200 mL of **water** for dilution if the patent can swallow, has a strong gag reflex, and does not drool ... . Do not attempt to neutralize. Cover skin burns with dry sterile dressings after decontamination ... . /Inorganic Bases/Alkaline Corrosives and Related Compounds/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3rd revised edition, Elsevier Mosby, St. Louis, MO 2007, p. 191-2

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Advanced treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious, has severe pulmonary edema, or is in severe respiratory distress. Early intubation, at the first signs of upper airway obstruction, may be necessary. Positive-pressure ventilation techniques with a bag valve mask device may be beneficial. Consider drug therapy for pulmonary edema ... . Monitor cardiac rhythm and treat arrhythmias as necessary ... . Start IV administration of D5W /SRP: "To keep open", minimal flow rate/. Use 0.9% saline (NS) or lactated Ringer's (LR) if signs of hypovolemia are present. For hypotension with signs of hypovolemia, administer fluid cautiously. Consider vasopressors if patient is hypotensive with a normal fluid volume. Watch for signs of fluid overload ... . Use **proparacaine hydrochloride** to assist eye irrigation ... . /Inorganic Bases/Alkaline Corrosives and Related Compounds/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds).; Emergency Care For Hazardous Materials Exposure. 3rd revised edition, Elsevier Mosby, St. Louis, MO 2007, p. 192

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