SAFETY DATA SHEET

Updated on 20/07/2024

1. Material Identification

Product Name : Beryllium Chloride
Catalog Number : io-1818
CAS Number : 7787-47-5
Identified uses : Laboratory chemicals, manufacture of chemical compounds
Company : Ionz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2)
Acute toxicity, oral (Category 3)
Acute toxicity, dermal (Category 3)
Acute toxicity, inhalation (Category 3)
Specific target organ toxicity, single exposure (Category 1)

Pictogram(s)

GHS Hazard Statements

>> H301 (100%): Toxic if swallowed [Danger Acute toxicity, oral]

>> H315 (100%): Causes skin irritation [Warning Skin corrosion/irritation]

>> H317 (100%): May cause an allergic skin reaction [Warning Sensitization, Skin]

>> H319 (100%): Causes serious eye irritation [Warning Serious eye damage/eye irritation]

>> H330 (100%): Fatal if inhaled [Danger Acute toxicity, inhalation]

>> H335 (100%): May cause respiratory irritation [Warning Specific target organ toxicity, single exposure; Respiratory tract irritation]

>> H350 (100%): May cause cancer [Danger Carcinogenicity]

>> H372 (100%): Causes damage to organs through prolonged or repeated exposure [Danger Specific target organ toxicity, repeated exposure]

>> H400 (100%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (100%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

>> H411 (100%): Toxic to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P260, P261, P264, P264+P265, P270, P271, P272, P273, P280, P284, P301+P316, P302+P352, P304+P340, P305+P351+P338, P316, P318, P319, P320, P321, P330, P332+P317, P333+P317, P337+P317, P362+P364, P391, P403+P233, P405, and P501

Health Hazards:

>> Inhalation causes pneumonitis, nasopharyngitis, tracheobronchitis, dyspnea, chronic cough. Ingestion causes irritation of mouth and stomach. Contact with dust causes conjunctival inflammation of eyes and irritation of skin. Any dramatic,

unexplained weight loss should be considered as a possible first indication of beryllium disease. (USCG, 1999)

>> Special Hazards of Combustion Products: Toxic and irritating beryllium oxide fumes and hydrogen chloride may form in fires. (USCG, 1999)

>> Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.

3. Composition/Information On Ingredients

Chemical name : Beryllium Chloride
CAS Number : 7787-47-5
Molecular Formula : BeCl2
Molecular Weight : 79.9200 g/mol

4. First Aid Measures

First Aid:

>> INHALATION: chest x-ray should be taken immediately for evidence of pneumonitis.

>> EYES: flush with water for at least 15 min.; if irritation persists, get medical attention.

>> SKIN: cuts or puncture wounds in which beryllium may be embedded under the skin should be thoroughly cleansed immediately by a physician. (USCG, 1999)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Half-upright position. Refer for medical attention.

Skin First Aid

>> Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention . Wear protective gloves when administering first aid.

Eye First Aid

>> First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Ingestion First Aid

>> Rinse mouth. Refer for medical attention .

5. Fire Fighting Measures

>> Fire Extinguishing Agents Not to Be Used: Do not use water on adjacent fires. (USCG, 1999)

>> In case of fire in the surroundings, use appropriate extinguishing media.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 154 [Substances - Toxic and/or Corrosive (Non-Combustible)]:

>> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

>> SPILL: Increase the immediate precautionary measure distance, in the downwind direction, as necessary.

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Dry. Well closed. Store only in original container. Store in an area without drain or sewer access.

Storage Conditions:

>> Keep container tightly closed in a dry and well-ventilated place.

8. Exposure Control/ Personal Protection

>> 0.002 [mg/m3], as Be, Ceiling(OSHA) = 0.005 mg/m3, as Be(0.025 mg/m3,as Be,for 30 min.peak per 8-hr shift)

>> 0.00005 [mg/m3], as Be, inhalable fraction

>> (as Be): (inhalable fraction): 0.00005 mg/m

EU-OEL

>> (inhalable fraction): 0.0002 mg/m

MAK (Maximale Arbeitsplatz Konzentration)

>> sensitization of respiratory tract and skin (SAH); carcinogen category: 1.

Inhalation Risk:

>> A harmful concentration of airborne particles can be reached quickly when dispersed.

Effects of Short Term Exposure:

>> The substance is irritating to the eyes, skin and respiratory tract. Inhalation of dust or fume may cause chemical pneumonitis. The effects may be delayed. Medical observation is indicated. Exposure could cause death.

Effects of Long Term Exposure:

>> Sensitization to the substance, through repeated or prolonged inhalation or skin contact, may result in serious granulomatous lung disease (chronic beryllium disease). This substance is carcinogenic to humans.

Fire Prevention

>> NO contact with water.

Exposure Prevention

>> PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!

Inhalation Prevention

>> Use closed system.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

>> Wear face shield or eye protection in combination with breathing protection.

Ingestion Prevention

>> Do not eat, drink, or smoke during work. Wash hands before eating.

9. Physical And Chemical Properties

Molecular Weight:

>> 79.92

Exact Mass:

>> 78.949888

Physical Description:

>> Beryllium chloride is a white to green solid with a sharp odor. (USCG, 1999)

>> COLOURLESS-TO-YELLOW CRYSTALS.

Color/Form:

>> White-yellow orthorhombic crystals

Odor:

>> Sharp, acrid

Taste:

The sensation of flavor perceived in the mouth and throat on contact with a substance.

>> Sweetish taste

Boiling Point:

>> 968 °F at 760 mmHg (sublimes) (USCG, 1999)

>> 482 °C

Melting Point:

>> 824 °F (USCG, 1999)

>> 399 °C

Solubility:

>> In water, 71.5 g/100 g water at 25 °C

>> Solubility in water, g/100ml at 25 °C: 71,5

Density:

>> 1.9 at 77 °F (USCG, 1999) - Denser than water; will sink

>> 1.9 g/cm³

Vapor Pressure:

>> 1 mm Hg at 291 °C (sublimes)

Corrosivity:

The ability of a chemical to damage or destroy other substances when it comes into contact.

>> Corrodes most metals in the presence of moisture.

pH:

pH is an expression of hydrogen ion concentration in water. Specifically, pH is the negative logarithm of hydrogen ion (H+) concentration (mol/L) in an aqueous solution. The term is used to indicate basicity or acidity of a solution on a scale of 0 to 14, with pH 7 being neutral.

>> Aqueous solution is strongly acid

10. Stability And Reactivity

>> Reacts with water with evolution of heat. Forms beryllium oxide and hydrochloric acid solution. Corrodes most metals in presence of moisture. Flammable and explosive hydrogen gas may collect in enclosed spaces (USCG, 1999).

>> Water-Reactive

11. Toxicological Information

Toxicity Summary:

>> Once in the body, beryllium acts as a hapten and interacts with human leucocyte antigen (HLA) DP presenting cells in the lungs, becoming physically associated with a major histocompatability (MHC) class II molecule. This MHC class II-beryllium-peptide complex is recognized by the T lymphocyte receptor, triggering CD4+ T lymphocyte activation and proliferation. The resulting inflammatory response is a cell-mediated process orchestrated by cytokines and results in the formation of (usually pulmonary) granulomas. Beryllium's toxicity may be controlled by the iron-storage protein ferritin, which sequesters beryllium by binding it and preventing it from interacting with other enzymes. (L25, A37, A91)

Evidence for Carcinogenicity:

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> There is sufficient evidence in humans for the carcinogenicity of beryllium and beryllium compounds. Beryllium and beryllium compounds cause cancer of the lung. There is sufficient evidence in experimental animals for the carcinogenicity of beryllium and beryllium compounds. Beryllium and beryllium compounds are carcinogenic to humans (Group 1). /Beryllium and beryllium compounds/

Carcinogen Classification:

This section provides the International Agency for Research on Cancer (IARC) Carcinogenic Classification and related monograph links. In the IARC Carcinogenic classification, chemicals are categorized into four groups: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans).

>> 1, carcinogenic to humans. (L135)

Health Effects:

>> Acute inhalation of a high level of beryllium can result in a pneumonia-like condition called acute beryllium disease. Chronic inhalation of beryllium can cause an inflammatory reaction in the respiratory system called chronic beryllium disease. Chronic beryllium disease may result in anorexia and weight loss, as well as right side heart enlargement and heart disease in advanced cases. Chronic exposure can also increase the risk of lung cancer. Skin contact with beryllium results in contact dermatitus. (L24, L25)

Exposure Routes:

>> The substance can be absorbed into the body in hazardous amounts by inhalation of its aerosol, by ingestion and through the skin.

>> Inhalation (L24)

Inhalation Exposure

>> Cough. Laboured breathing. Sore throat. Shortness of breath. Symptoms may be delayed.

Skin Exposure

>> Redness. Pain. MAY BE ABSORBED!

Eye Exposure

>> Redness. Pain.

Ingestion Exposure

>> Nausea. Vomiting. Abdominal pain.

>> Chronic beryllium disease causes fatigue, weakness, difficulty breathing, and a persistent dry cough. (L24, L25)

Adverse Effects:

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Dermatotoxin - Skin burns.

>> Toxic Pneumonitis - Inflammation of the lungs induced by inhalation of metal fumes or toxic gases and vapors.

>> Fibrogenic - Inducing tissue injury and fibrosis (scarring).

Toxicity Data:

>> LD50: 9.7 mg/kg (Oral, Rat) (T73)

Minimum Risk Level:

The minimal risk level (MRL) is an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health

>> Chronic Oral: 0.002 mg/kg/day (L134)

Treatment:

Treatment when exposed to toxin

>> Chronic beryllium disease is treated with immunosuppressive medicines, usually of the glucocorticoid class. (L24)

Interactions:

>> Beryllium chloride (BeCl(2)) is a highly toxic substance that accumulates in different tissues after absorption. The purpose of this study was to investigate protective role of crocin against BeCl(2)-intoxication in rats. Male Wistar rats were used in this study and categorized into four groups (n=8). Group I served as normal control rats. Group II treated orally with BeCl(2) 86 mg/kg b.w. for five consecutive days. This dose was equivalent to experimental LD(50). Group III treated ip with crocin 200 mg/kg bw for seven consecutive days. Group IV received crocin for seven consecutive days before BeCl(2) administration. Blood samples and liver and brain homogenates were obtained for hematological, biochemical and RT-PCR examinations. The hematocrit value, RBCs count and hemoglobin concentration were significantly decreased in BeCl(2)-treated rats. A significant increase was observed in rat liver and brain malondialdehyde level and protein carbonyls content in BeCl(2) exposed group compared to the control group, and these values were significantly declined upon administration of crocin. Lactate dehydrogenase levels in rat liver and brain significantly increased compared to the control group and was associated with significant decrease in catalase and superoxide dismutase activities. Reduced glutathione hepatic contents of BeCl(2)-treated rats were significantly decreased. There was significant decline in mRNA expression of catalase and superoxide dismutase genes in BeCl(2)-intoxicated rats compared to the normal rats. Crocin treatment prior to BeCl(2) intake resulted in significant increase in mRNA expressions of catalase and superoxide dismutase genes near to normalcy. The hematological and biochemical parameters were restored near to normal levels. Our results suggested that, BeCl(2) induced oxidation of cellular lipids and proteins and that administration of crocin reduced BeCl(2)-induced oxidative stress combined with initiation of mRNA expression of antioxidant genes.

Antidote and Emergency Treatment:

>> Diethylenetriaminepentamethylphosphonic acid calcium sodium salt (DTPP) injected ip at 100-500 mg/kg, significantly increased the survival of the beryllium chloride treated animals (rats and mice). The preparation accelerated the elimination of the beryllium ions from the organism.

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ ... Since introducing a patch testing series for patients with suspected sensitization to metal, /the authors/ have found 3 cases of sensitization to beryllium. Of these 3 cases, /the authors/ regard the first 2 as having relevant sensitization. Beryllium chloride (1% pet.) was positive in 3 patients and negative in 150 controls.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ Beryllium chloride induced skin hypersensitivity in rats.

Non-Human Toxicity Values:

>> LD50 Rats oral 200 mg Be/kg /as BeCl2/

12. Ecological Information

ICSC Environmental Data:

>> The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised not to let the chemical enter into the environment.

13. Disposal Considerations

Spillage Disposal

>> Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

Disposal Methods

>> SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational harm/injury/toxicity or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or water; effects on animal and plant life; and conformance with environmental and public health regulations.

>> SRP: Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer and disposal. If it is not practicable to manage the chemical in this fashion, it must be evaluated in accordance with EPA 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state and federal requirements for disposal.

>> Product: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Contaminated packaging: Dispose of as unused product.

>> ... Beryllium chloride ... waste should be converted into chemically inert oxides using incineration and particulate collection techniques. These oxides ... should be returned to suppliers if possible.

14. Transport Information

DOT

Beryllium Chloride
6.1
UN Pack Group: II
Reportable Quantity of 1 lb or 0

IATA

Beryllium Chloride
6.1,
UN Pack Group: II

15. Regulatory Information

Federal Drinking Water Standards:

Federal drinking water standards (e.g. maximum containment level (MCL)) for this chemical. These standards are legally enforceable.

>> Maximum contaminant level for inorganic contaminants: Contaminant: Beryllium; MCL 0.004 mg/L. /Beryllium/

Federal Drinking Water Guidelines:

Federal drinking water guidelines (e.g. maximum containment level (MCL)) for this chemical. In general, these guidelines are recommendations and not legally enforceable.

>> Maximum contaminant level goal for inorganic contaminants: Contaminant: Beryllium; MCLG 0.004 mg/L. /Beryllium/

Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> Beryllium chloride is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Beryllium chloride (BeCl2)

16. Other Information

Toxic Combustion Products:

Toxic products (e.g., gases and vapors) produced from the combustion of this chemical.

>> Hazardous decomposition products formed under fire conditions: Hydrogen chloride gas, Beryllium oxides

Other Safety Information

Chemical Assessment

>> IMAP assessments - Soluble beryllium salts: Human health tier II assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."