

LABORATORY CHEMICAL SAFETY SUMMARY: SODIUM CYANIDE AND POTASSIUM CYANIDE

Substance(s) Sodium cyanide CAS 143-33-9; Potassium cyanide CAS 151-50-8

Formula NaCN; KCN

Physical Properties White solids

NaCN: bp 1496 °C, mp 564 °C; KCN: bp 1625 °C, mp 634 °C

Soluble in water (NaCN: 37 g/100 mL; KCN: 41 g/100 mL)

Odor The dry salts are odorless, but reaction with atmospheric moisture produces HCN, whose bitter almond odor is detectable at 1 to 5 ppm; however, 20 to 60% of the population are reported to be unable to detect the odor of HCN.

Vapor Pressure Negligible

Flash Point Noncombustible

Toxicity Data

LD₅₀ oral (rat) 6.4 mg/kg (NaCN); 5 mg/kg (KCN)

TLV-TWA (ACGIH) 5 mg/kg (KCN)-skin

Major Hazards Highly toxic; exposure by eye or skin contact or ingestion can be rapidly fatal.

Toxicity

The acute toxicity of these metal cyanides is high. Ingestion of NaCN or KCN or exposure to the salts or their aqueous solutions by eye or skin contact can be fatal; exposure to as little as 50 to 150 mg can cause immediate collapse and death. Poisoning can occur by inhalation of mists of cyanide solutions and by inhalation of HCN produced by the reaction of metal cyanides with acids and with water. Symptoms of nonlethal exposure to cyanide include weakness, headache, dizziness, rapid breathing, nausea, and vomiting. These compounds are not regarded as having good warning properties.

Effects of chronic exposure to sodium cyanide or potassium cyanide are nonspecific and rare.

Flammability and Explosibility

Sodium cyanide and potassium cyanide are noncombustible solids. Reaction with acids liberates flammable HCN.

Reactivity and Incompatibility

Reaction with acid produces highly toxic and flammable hydrogen cyanide (HCN) gas. Reaction with water can produce dangerous amounts of HCN in confined areas.

Storage and Handling

Sodium cyanide and potassium cyanide should be handled in the laboratory using practices developed by the academic department for such highly toxic chemicals. In particular, work with cyanides should be conducted in a fume hood to prevent exposure by inhalation, and splash goggles and impermeable gloves should be worn at all times to prevent eye and skin contact. Cyanide salts should be stored in a cool, dry, secured storage location, separated from acids.

Accidents

In the event of skin contact, immediately wash with soap and water and remove contaminated clothing. In case of eye contact, promptly wash with copious amounts of water for 15 min (lifting upper and lower lids occasionally) and obtain medical attention. If sodium or potassium cyanide is ingested, obtain medical attention immediately. If cyanide is inhaled, move the person to fresh air and seek medical attention at once. Specific medical procedures for treating cyanide exposure are available but usually must be administered by properly trained personnel.

In the event of a small spill, remove all ignition sources, soak up the sodium cyanide or potassium cyanide with absorbent material, place in an appropriate labeled container, and place in secondary containment for hazardous waste disposal.

Disposal

Excess sodium or potassium cyanide and waste material containing this substance should be placed in an appropriate container and clearly labeled. Secondary containment is required. Cyanide wastes will be RCRA hazardous wastes, either Listed Acute Hazardous Wastes (various P-codes), Listed Hazardous Waste (various U-codes) or Reactive Characteristic Hazardous Waste (D003).

The information in this LCSS has been compiled by a committee of the National Research Council from literature sources and Material Safety Data Sheets and is believed to be accurate as of July 1994. This summary is intended for use by trained laboratory personnel in conjunction with the NRC report Prudent Practices in the Laboratory: Handling and Disposal of Chemicals. This LCSS presents a concise summary of safety information that should be adequate for most laboratory uses of the title substance, but in some cases it may be advisable to consult more comprehensive references. This information should not be used as a guide to the nonlaboratory use of this chemical.

