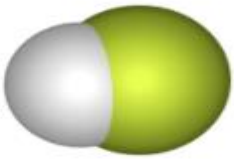
Lesson Learn

2020 年 12 月

1、What is hydrofluoric acid?

Hydrofluoric acid (HF) is a dangerous inorganic acid, which is widely used in chemical industry, electronics manufacturing, glass etching, smelting, cleaning and other industrial fields. It exists in two forms: one is hydrofluoric acid with a purity greater than 99%, called anhydrous hydrofluoric acid; the other is dilute hydrofluoric acid, called hydrofluoric acid. It can enter the human body through the skin, mucous membranes, digestive tract and respiratory tract, which not only has severely corrosive to local tissues, but also has systemic toxicity. In particular, it can decalcify and dissolve bones, which makes it commonly known as "bone-melting water"

氢氟酸	
	
	
IUPAC名 Hydrofluoric acid	
别名	氟化氢

2、What harm does hydrofluoric acid have to the human body?

The damage of hydrofluoric acid is mainly the following four points:

1. Affect the heart nerve

The fluoride ions in hydrofluoric acid combine with calcium ions in the blood to affect nerve function.

2. Fluorosis

Fluoride ions can decalcify and cause bone

density to decrease, causing bones to become hard and brittle, and teeth are brittle and broken.

3. Tissue necrosis

After hydrofluoric acid contacts the skin, fluoride ions will continue to dissociate and penetrate into deep tissues, dissolve cell membranes, and cause tissue necrosis. Long-term exposure to low concentrations of hydrofluoric acid without protecting can also be absorbed through the skin and cause cumulative poisoning.

4. Respiratory tract injury

Hydrofluoric acid will volatilize to form acid mist. Inhalation will irritate the respiratory tract and cause bronchitis, which can also cause hemorrhagic pulmonary edema if large amount of HF was absorbed.

3. How to first aid for hydrofluoric acid burns?

The damage mechanism of hydrofluoric acid is mainly related to the massive absorption of HF and the release of hydrogen ions. The key to treating hydrofluoric acid burns is to prevent the continuous absorption of hydrofluoric acid and prevent the gradual destruction of HF by fluoride ions. Calcium gluconate is a special antidote, which can react with hydrofluoric acid to produce non-toxic and insoluble calcium fluoride. This can be administered intravenously or locally.

However, hydrofluoric acid has a strong tissue permeability, a large amount of fluoride ions diffuses into the tissue or be absorbed into the blood may cause serious systemic toxicity, and even life-threatening. Although washing and using calcium gluconate gel can avoid local tissue damage, it may

not prevent fatal systemic symptoms. Therefore, in addition to timely treatment of local HF burns, the poisoned person should be sent to the hospital as soon as possible for systemic examination and comprehensive treatment.

4、How to protect the use of hydrofluoric acid

• It is recommended that operators should wear self-priming filter gas masks (full face masks), wear rubber acid and alkali resistant clothing, and rubber acid and alkali resistant gloves.

• The operation is as mechanized and automated as possible.

• Operators must undergo special training and strictly abide by operating procedures.

• Prevent the vapor from leaking into the air in the workplace.

• Avoid contact with alkalis, active metal powders and glass products.

• Load and unload with care to prevent damage to packaging and containers. Equipped with leakage emergency treatment equipment.

• Store in a cool, ventilated warehouse. Keep away from fire and heat sources.

• Keep the container tightly closed.

• Should be stored separately from alkalis, active metal powders, and glass products, and avoid mixed storage.

The storage area should be equipped with leakage emergency treatment equipment and suitable storage materials。

Nothing we do is worth getting hurt for !