Intel NM Chemical of the Month
March 2022

Hydrogen Fluoride (HF)

[The following is a compilation of material from the websites of the Centers for Disease Control and Prevention and the National Institutes of Health.]

Hydrogen fluoride is a chemical compound that contains fluorine. It can exist as a colorless gas or as a fuming liquid, or it can be dissolved in water. When hydrogen fluoride is dissolved in water, it may be called hydrofluoric acid. Hydrogen fluoride can be released when other fluoride-containing compounds such as ammonium fluoride are combined with water. It is used for a variety of industrial processes including etching glass and cleaning in the manufacture of glass, semiconductors, computer chips and ceramics.

Hydrogen fluoride is highly corrosive to all tissues. It goes easily and quickly through the skin and into the tissues in the body. There it damages the cells and causes them to not work properly. The seriousness of poisoning caused by hydrogen fluoride depends on the amount, route, and length of time of exposure, as well as the age and preexisting medical condition of the person exposed.

Breathing hydrogen fluoride can damage lung tissue and cause swelling and fluid accumulation in the lungs (pulmonary edema). Skin contact with hydrogen fluoride may cause severe burns that develop after several hours and form skin ulcers. Systemic absorption occurs following skin exposure or ingestion and can lead to serious organ damage and death.

Chronic inhalation exposure of humans to low levels of hydrogen fluoride has resulted in irritation and congestion of the nose, throat, and lungs. Skeletal fluorosis, a bone disease, was reported among workers chronically exposed to fluorides (including hydrogen fluoride) via inhalation. Damage to the liver, kidneys, and lungs has been observed in animals chronically exposed to hydrogen fluoride by inhalation. (1)

EPA has not established a Reference Concentration (RfC) or a Reference Dose (RfD) for hydrogen fluoride.