

## 38—Industrial Toxicology

employees exposed to vanadium pentoxide over a period of nine years were observed. About 20 of the exposed group were employed continuously for more than eight years. One employee exposed to the dust showed convulsive cough with occasional spitting of blood, shortness of breath, palpitation on exertion, chest pains, bronchitis and bronchospasm, emphysematous chest, elevated blood pressure, and a reticulated pattern on the chest X ray. The pallor which commonly accompanies vanadium pentoxide exposure was attributed to its action in constricting the capillaries in the skin rather than to anemia. Blood counts showed no anemia.

Vinyl acetate is considered a chemical of low toxicity, based not only on the findings in relatively limited animal experimentation, but also on years of use experience. No systemic effects have been reported, and no chromic effects or sensitization have been noted. As usually handled, no health hazard is present, either from inhalation of the vapor or contact of liquid with the skin or eyes.

There are no indications for other than usual preemployment or periodic physical examinations for those who will handle vinyl acetate, nor would there seem to be any special physical conditions making exposure a particular hazard.

The primary hazard in handling vinyl acetate is due to its flammability rather than its effect on health.

Vinyl chloride (chloroethylene) is a gaseous chlorinated hydrocarbon used as a refrigerant but primarily as a raw material in the plastics industry. It is an anesthetic in high concentrations.

Vinyl propionate is an unsaturated ester which appears to have an astonishingly high toxicity for a class of compounds known for their low toxicity. Rats exposed to 4 ppm showed stimulation and then depression of respiration, and died if not removed from the exposure. Daily exposure did not seem to result in accumulation.

Vinylidene chloride (1,1-dichloroethylene) is a chlorinated hydrocarbon of about the same vapor toxicity as ethylene dichloride.

The main hazard of vinylidene chloride is the ease with which it forms peroxides on exposure to air or oxygen. The peroxide is absorbed on the surface of the polymer which precipitates. An attempt to filter off or to dry the polymer usually results in a violent explosion. Usually, the whole mixture quickly becomes explosive if the polymer is left in the suspension.

This compound should be stored in a closed system with oxygen or air excluded, preferably, it should be kept under a positive pressure of an inert gas.

### X

Xylene is a solvent mixture of the ortho, meta, and para isomers. It resembles benzene in many physical and chemical properties, but does not produce the chronic blood diseases characteristic of benzene absorption.

Xylene's severe narcotic action is usually noted when concentrations exceed 200 ppm. Repeated skin contact may produce a dermatitis.

### Z

**Zinc and Zinc oxide.** Inhalation of a considerable quantity of freshly formed fume, usually from welding on zinc coated metal, will produce "metal fume fever," which is highly disabling but usually the individual recovers completely within 24 hr.

**Zirconium** is principally used in massive forms and as powder by the Atomic Energy Commission. It is an extreme fire and explosion hazard in the dust or powdered form. Its health hazard for both acute and chronic exposures is low. Animal experiments on inhalation and ingestion and evaluation of the skin effects of zirconium ointments all support the fact that no cases of industrial systemic poisonings have been reported.

## Sources of Help

Many associations are concerned with industrial toxicology problems. Some are prepared to provide consultation service to nonmembers, all have a wealth of available technical information.

Organizations having a high degree of interest in industrial toxicology include the fol-