



Heavy Metals Safety

P-Listed Chemicals* - Designated as acutely toxic hazardous waste by the EPA

Acutely Toxic Materials – Rat LD₅₀: Oral <50 mg/kg

- Can cause health issues after a single or short-term exposure that range from illness to death

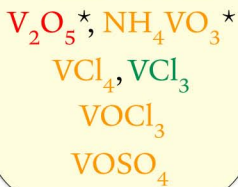
Safety Precautions

- Do not work alone
- Familiarize yourself with the protocol and compound's hazards from the SDS
- Wear additional PPE (e.g. apron, face shield) and select the appropriate gloves
- Conduct all chemistry in the fume hood
- Store in ventilated cabinets below eye level
- Decontaminate work area after use

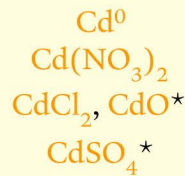
Waste Disposal

- Label as “Hazardous Waste”
- Segregate from all other waste
- Do not accumulate > 1 L
- Dispose of empty or unwanted bottles as hazardous waste
- Dispose of items in contact with the material as hazardous waste or clean thoroughly (e.g. pipettes, spatulas, weigh boats)

Vanadium



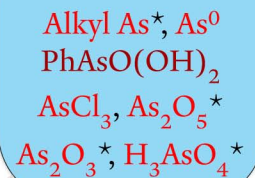
Cadmium



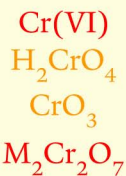
Tin



Arsenic



Chromium

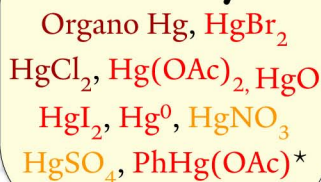


Periodic Table of the Elements

Osmium



Mercury



Thallium



The dose makes the poison.

Case Study: Organomercury Poisoning

Karen Wetterhahn (October 16, 1948 – June 8, 1997) was a professor of chemistry at Dartmouth College, New Hampshire, who specialized in toxic metal exposure. She died of mercury poisoning after an incident where she was exposed to dimethylmercury. Gloves in use at the time of the accident provided insufficient protection, and exposure to only a few drops absorbed through the gloves and proved to be fatal after <1 year.

Tests revealed that she had a blood mercury level of 4,000 $\mu\text{g/L}$, or 80X the toxic threshold. It was later determined that dimethylmercury can rapidly permeate latex gloves and enter the skin within 15 seconds. It is now accepted that the only safe way to handle this compound is to wear highly resistant laminated gloves underneath a pair of long-cuffed neoprene (or other heavy duty) gloves.

Classification Criteria	Oral LD ₅₀ mg/kg bodyweight
Category 1	≤ 5
Category 2	> 5 and ≤ 50
Category 3	> 50 and ≤ 300
Category 4	> 300 and ≤ 2000
Hazard Communication Standard Acute Oral Toxicity Categories and Classification Criteria (OSHA)	