



Lithium



Vol. 1, No. 4: Clandestine Drug Labs/ Methamphetamine

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Recognizing Lithium

Appearance: Lithium is a soft, silvery-white metal that becomes yellowish upon exposure to moist air. It is soluble in liquid ammonia, producing a blue solution.

Odor & Odor Threshold: Not applicable. Lithium metal is odorless.

Vapor Density: Not applicable. Lithium is not volatile.

Odor Safety Class: Not applicable. Lithium is odorless. Therefore, odor provides no warning of hazard.

Containers & Packaging

Commercial: Lithium metal in the form of ribbon, wire, rod, ingot, granules, powder, or shot can be purchased from chemical supply houses. Rechargeable and non-rechargeable lithium batteries are frequently used to obtain elemental lithium for use in the illegal synthesis of methamphetamine (Figure 1, A & B).

Pharmaceutical: Lithium for pharmaceutical use contains lithium carbonate or lithium citrate, both of which are salts of elemental lithium, but lithium salts cannot be used to make metallic lithium and are not used for illicit synthesis of methamphetamine.

Role in Drug Synthesis

Elemental lithium is used as a catalyst to synthesize methamphetamine from ephedrine in the ammonia / alkali metal synthesis method commonly referred to as the "Nazi" method.

Health Hazards

General: Little information on the toxicity of elemental lithium is available. The greatest health concerns regarding lithium metal come from exposure to lithium hydroxide (LiOH); a strong, highly corrosive base formed when lithium reacts with water.

Inhalation Exposure: Since lithium metal is not volatile, inhalation is not typically a significant route of exposure for lithium metal. However, if finely divided lithium particles were inhaled, serious injury to the nasal passages, upper airways, and lungs due to formation of LiOH could result. Respiratory distress syndrome has been reported in cases of severe exposure resulting in shortness of breath, rapid breathing, and low arterial blood oxygen.

Skin (Dermal) Exposure: Dermal uptake of lithium is not likely to be a significant route of exposure. Absorption of solid lithium across the skin is poor, although contact with finely divided lithium or lithium powder might present a hazard because these forms

may react with skin moisture to form corrosive LiOH.

Eye Contact: Exposure to lithium particles may result in serious eye injury due to the formation of highly corrosive LiOH.

Ingestion: In large amounts, lithium would primarily affect the gastrointestinal (GI) tract, the central nervous system (CNS), and the kidneys. Acute GI effects include abdominal pain, nausea, vomiting, and diarrhea. CNS effects include tremors, loss of muscle coordination, muscle rigidity, lethargy, and exaggerated reflexes. Sedation, mental confusion, agitation, seizures, and coma may occur at high doses. Symptoms associated with kidney

toxicity are an initial increase in urine output, subsequent elevation in blood non-protein nitrogen, and finally, diminished urine output. Other potential adverse effects include cardiac arrhythmias, low blood pressure, and kidney toxicity.



Figure 1: Lithium is a light-weight silvery colored metal used to synthesize methamphetamine. It is collected from camera batteries [A] and other small button type batteries [B]. Once these batteries are broken open, the lithium [B.1.] immediately begins to react with air [B.2.]. Photographers, Charles Salocks and Caron Poole.

Environmental Concerns

General: Only small amounts of lithium are required for synthesis of methamphetamine. For this reason, waste generated by a clandestine methamphetamine lab is unlikely to result in significant lithium contamination of soil, surface water, or ground water.

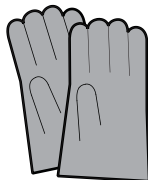
Soil: The earth's crust naturally contains lithium with varying concentrations depending upon location. As noted above, contamination of soil is unlikely.

Ground Water & Surface Water: No information available.

Drinking Water: California state standards for lithium compounds in drinking water have not been established.

Indoors: Lithium surfaces may become coated with a mixture of lithium hydroxide, lithium carbonate, and lithium nitride. Lithium hydroxide is extremely corrosive; however, since the amount of lithium used is small, the amount of lithium hydroxide formed will also be small.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. If victim is not breathing, give artificial respiration. If victim has difficulty breathing, give oxygen. Keep victim in a half upright position. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Seek medical attention if necessary.

Contact with Eyes: Flush exposed eyes with water for at least 30 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: If victim is conscious, give 2-4 cups of milk or water. Do not induce vomiting. Seek medical attention.

Special Concerns for Children: Children may not recognize the dangers associated with chemical exposures. They may therefore be more susceptible to accidental or purposeful exposures.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA & ACGIH)

Short-Term (STEL): not established.

Threshold Limit (TLV): not established.

Immediately Dangerous (IDLH): not established.

Preliminary Remediation Goals (PRGs):

Air: not established.

Soil: Residential: 1,600 ppm (1,600 mg/kg)

Industrial: 20,000 ppm (20,000 mg/kg)

Water: 730 ppb (730 µg/L)

Chemical Hazards

Reactivity: Lithium is less reactive than sodium and much less reactive than potassium. Freshly cut surfaces tarnish in air due to reaction with oxygen and nitrogen. Pieces of lithium metal react slowly with water to liberate hydrogen, a flammable gas.

Flammability: Lithium is a flammable solid. Finely divided and powdered lithium metal may ignite in air at ambient temperatures and reacts vigorously with water to form hydrogen gas and a strong caustic solution of lithium hydroxide. Since reaction with water may lead to spontaneous ignition, powdered or granular lithium should not be combined with water. If heated to its melting point (357 °F, or 181 °C), lithium is likely to ignite spontaneously.

Chemical Incompatibilities: Water and air.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov