Standard Operating Procedure

**Lead Dioxide**

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and   
3) SOP has been signed and dated by the PI and relevant lab personnel.*

Print a copy and insert into your   
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.   
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:** ☐ Process ☒Hazardous Chemical ☐ Hazardous Class

**Purpose**

Lead dioxide (also known as lead (IV) oxide) is an inorganic compound that is toxic if ingested or inhaled and may be harmful if absorbed through the skin. It is a strong oxidizer that may cause and/or intensify a fire upon contact with other material. It may cause irritation to the gastrointestinal tract, respiratory tract, skin, and eyes. It is classified by IARC as Group 2A, probably carcinogenic to humans. It is a suspected teratogen and reproductive toxin. Symptoms of lead poisoning may occur upon exposure. Lead dioxide is used in the manufacture of dyes, matches, pyrotechnics, rubber substitutes, and the curing of polysulfides. It has many important applications in electrochemistry, especially its use in lead acid batteries.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 1309-60-0

Class: **Oxidizer, toxic, carcinogen, teratogen, reproductive toxin**

Molecular Formula: O2Pb

Form (physical state): Solid

Color: Dark brown

Boiling point: N/A

**Potential Hazards/Toxicity**

Lead dioxide is a strong oxidizer. Contact with other material may cause and/or intensify a fire. It is classified by IARC as Group 2A, probably carcinogenic to humans. It is toxic if ingested or inhaled and may be harmful if absorbed through the skin. It may cause irritation to the gastrointestinal tract, respiratory tract, skin, and eyes. Symptoms of overexposure include joint and muscle pain, weakness of the extensor muscles, headache, dizziness, abdominal pain, diarrhea, constipation, nausea, vomiting, blue line on the gums, insomnia, metallic taste, increased cerebrospinal pressure, brain damage, effects on blood, nervous, and digestive systems, liver and kidney damage, anemia, stupor leading to coma, anorexia, convulsions, and death. Neuromuscular dysfunction, possible paralysis, and encephalopathy can occur if left untreated. It is a presumed reproductive toxicant. Lead salts may cross the placenta. Adverse effects may occur on human reproduction, embryonic and fetal development, and postnatal development. Lead inorganic-containing compounds have a permissible exposure limit (PEL) of 50 µg/m3.

**Personal Protective Equipment (PPE)**

**Respirator Protection**

Use a full-face particle respirator with type N100 (US) respirator cartridges.

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

Handle with gloves. Nitrile gloves are recommended.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with lead dioxide.

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI approved, tight-fitting glasses/goggles.

**Skin and Body Protection**

Flame-resistant lab coat preferably made of anti-static material, long pants, closed-toe shoes.

**Hygiene Measures**

Avoid contact with skin, eyes, and clothing. Wash hands before breaks and after handling.

**Engineering Controls**

Chemical fume hood. Adequate exhaust and capture filtration. Electrically grounded lines and equipment.

**First Aid Procedures**

**If inhaled**

Move person into fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.

**In case of skin contact**

Flush with plenty of water for at least 15 minutes while removing contaminated clothing. Consult a physician.

**In case of eye contact**

Flush eyes with plenty of water for at least 15 minutes lifting upper and lower eyelids and removing contact lenses. Consult a physician.

**If swallowed**

Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**Special Handling and Storage Requirements**

**Precautions for safe handling:** Avoid contact with skin, eyes, and clothing. Avoid inhalation and ingestion. Avoid dust formation. Provide adequate ventilation. Keep away from heat and other sources of ignition- No smoking.

**Conditions for safe storage:** Keep container tightly closed in a cool, dry, and well-ventilated area. Avoid strong reducing agents, combustible materials, and powdered metals.

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Wearing proper PPE, decontaminate equipment and bench tops using soap and water. Sweep up or shovel spills avoiding dust formation. Dispose of the used chemical and contaminated disposables as hazardous waste.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with lead dioxide, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

**Principal Investigator SOP Approval**

Print name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date:

I have read and understand the content of this SOP:

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| **Name** | **Signature** | **Date** |
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