TCI AMERICA
SAFETY DATA SHEET

Revision number: 1
Revision date: 07/06/2018

1. IDENTIFICATION

Product name: Lead(II) Chloride (purified by sublimation) [for Perovskite precursor]
Product code: L0291

Product use: For laboratory research purposes.
Restrictions on use: Not for drug or household use.

Company:
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Chemical Emergencies:
TCI America (8:00am - 5:00pm) PST
+1-503-286-7624
Transportation Emergencies:
Chemtrec 24-Hour
+1-800-424-9300 (U.S.A.)
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Responsible department:
TCI America
Environmental Health Safety and Security
+1- 503-286-7624

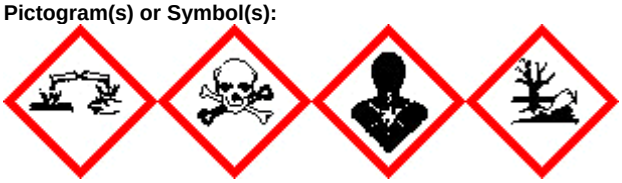
2. HAZARD(S) IDENTIFICATION

OSHA Haz Com: CFR 1910.1200:
WHMIS 2015:
Acute Toxicity - Oral [Category 3]
Acute Toxicity - Inhalation [Category 3]
Eye Damage/Irritation [Category 1]
Carcinogenicity [Category 1B]
Toxic to Reproduction [Category 1A]
Specific Target Organ Toxicity (Single Exposure) [Category 1]
Specific Target Organ Toxicity (Repeated Exposure) [Category 1]
Specific Target Organ Toxicity (Repeated Exposure) [Category 2]
Aquatic Hazard (Acute) [Category 1]
Aquatic Hazard (Long-Term) [Category 1]

Signal word: Danger!

Hazard Statement(s):
Toxic if swallowed or if inhaled
Causes serious eye damage
May cause cancer
May damage fertility or the unborn child
Very toxic to aquatic life
Very toxic to aquatic life with long lasting effects
Causes damage to: Blood System Nervous System Kidney
Causes damage to organs through prolonged or repeated exposure: Blood System Nervous System Kidney
May cause damage to organs through prolonged or repeated exposure: organs

Pictogram(s) or Symbol(s):



Precautionary Statement(s):

[Prevention] Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust, fume, mist, vapors or spray. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not eat, drink or smoke when using this product. Wash hands and face thoroughly after handling. Wear protective gloves, protective clothing, face protection.

[Response] If swallowed: Immediately call a poison center or doctor. Rinse mouth. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor. If exposed: Call a poison center or doctor. Collect spillage.

[Storage] Store in a well-ventilated place. Keep container tightly closed. Store locked up.

[Disposal] Dispose of contents and container in accordance with local, regional, national regulations (e.g. US: 40 CFR Part 261, EU:91/156/EEC, JP: Waste Disposal and Cleaning Act, etc.).

Hazards not otherwise classified: [HNOC] None.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/mixture: Substance
Components: Lead(II) Chloride (purified by sublimation) [for Perovskite precursor]
Percent: ....
CAS RN: 7758-95-4
Molecular Weight: 278.10
Chemical Formula: $PbCl_2$

4. FIRST-AID MEASURES

Description of first aid measures

Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician.

Skin contact: Remove/Take off immediately all contaminated clothing. Gently wash with plenty of soap and water. Call a POISON CENTER or doctor/physician.

Eye contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Call a POISON CENTER or doctor/physician.

Ingestion: Immediately call a POISON CENTER or doctor/physician. Rinse mouth.

Symptoms/effects:

Acute: No data available

Delayed: No data available

Indication of any immediate medical attention:
Not available.
Notes to physician:
No data available

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Dry chemical, foam, water spray, carbon dioxide.

Specific hazards arising from the chemical: Take care as it may decompose upon combustion or in high temperatures to generate poisonous fume.
Hazardous combustion products: These products include: Halogenated compounds Metallic oxides
Other specific hazards: WARNING: Highly toxic HCl gas is produced during combustion.

Advice for firefighters: Wear self-contained breathing apparatus if possible.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Keep people away from and upwind of spill/leak. Entry to non-involved personnel should be controlled around the leakage area by roping off, etc.
Environmental precautions: Be careful not to let it flow into rivers, etc., since adverse effects on the environment are concerned.
Methods and materials for containment and cleaning up: Sweep dust to collect it into an airtight container, taking care not to disperse it. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

7. HANDLING AND STORAGE

Precautions for safe handling: Handling is performed in a well ventilated place. Wear suitable protective equipment. Prevent dispersion of dust. Wash hands and face thoroughly after handling.
Use a closed system if possible. Use a local exhaust if dust or aerosol will be generated.
Avoid all contact!

Conditions for safe storage, including any incompatibilities

Storage conditions: Keep container tightly closed. Store in a cool, dark and well-ventilated place.
Store under inert gas. Store locked up.
Store away from incompatible materials such as oxidizing agents.
Air-sensitive

Packaging material: Comply with laws.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits:

ACGIH TLV(TWA):	0.05 mg(Pb)/m^3
OSHA PEL(TWA):	0.03 mg(Pb)/m^3
JSOH OELs(TWA):	0.03 mg(Pb)/m^3

Appropriate engineering controls: Follow safe industrial engineering/laboratory practices when handling any chemical. Install a closed system or local exhaust. Also install safety shower and eye bath.

Personal protective equipment

Respiratory protection:	Dust respirator, self-contained breathing apparatus(SCBA), supplied air respirator, etc. Use respirators approved under appropriate government standards and follow local and national regulations.
Hand protection:	Impervious gloves.
Eye protection:	Safety goggles. A face-shield, if the situation requires.
Skin and body protection:	Impervious protective clothing. Protective boots, if the situation requires.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state (20°C):	Solid
Form:	Crystal - Powder
Colour:	White - Almost white
Odour:	No data available
Odor threshold:	No data available
Odour threshold:	No data available

Melting point/freezing point:	501°C (934°F)	pH:	No data available
Boiling point/range:	951°C (1744°F)	**Vapour pressure:**	No data available.
Decomposition temperature:	No data available	**Vapour density:**	No data available
Relative density:	No data available	**Dynamic Viscosity:**	No data available
Kinematic viscosity:	No data available		
Log Pow:	No data available	**Evaporation rate(Butyl Acetate=1):**	No data available
Flash point:	No data available	**Autoignition temperature:**	No data available
Flammability(solid, gas):	No data available	**Flammability or explosive limits:**	
		Lower:	No data available
		Upper:	No data available

Solubility(ies):

[Water]	Slightly soluble
[Other solvents]	No data available

10. STABILITY AND REACTIVITY

Reactivity:	No data available
Chemical stability:	Stable under proper conditions.
Possibility of hazardous reactions:	No special reactivity has been reported.
Incompatible materials:	Oxidizing agents
Hazardous decomposition products:	Hydrogen chloride, Phosphorus oxides

11. TOXICOLOGICAL INFORMATION

RTECS Number: OF9450000

Acute Toxicity:
orl-rat LD50:>1947 mg/kg
ipr-rat LD50:>1251 mg/kg

Skin corrosion/irritation:
No data available

Serious eye damage/irritation:
No data available

Respiratory or skin sensitization:
No data available

Germ cell mutagenicity:
mnt-ham-ovr 1.1 umol/L/18H
sce-hmn-lym 100 ng/cm3
dni-mus-fbr 20 umol/L

Carcinogenicity:
No data available

IARC: Group 2A (Probably carcinogenic to humans).
NTP: b (Reasonably anticipated to be carcinogens).
OSHA: No data available

Reproductive toxicity:
orl-rat TDLo:570 mg/kg (14D pre-21D post)
ivn-mus TDLo:20 mg/kg (8D preg)

Target organ(s):
Causes damage to: Blood System Nervous System Kidney
Causes damage to organs through prolonged or repeated exposure: Blood System Nervous System Kidney
May cause damage to organs through prolonged or repeated exposure: organs

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish:	96h LC50:0.12 mg/L (Oncorhynchus mykiss)
Crustacea:	48h LC50:0.168 mg/L (Daphnia magna)
Algae:	24h EC50:0.014 mg/L (Chlorella pyrenoidosa) 96h NOEC:0.06 mg/L (Selenastrum capricornutum)

Persistence / degradability: No data available
Bioaccumulative potential(BCF): No data available
Mobility in soil

Log Pow:	No data available
Soil adsorption (Koc):	No data available
Henry's Law (PaM ^{3}/mol):	No data available

13. DISPOSAL CONSIDERATIONS

Disposal of product: Recycle to process if possible. It is the generator's responsibility to comply with Federal, State and Local rules and regulations. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. This section is intended to provide assistance but does not replace these laws, nor does compliance in accordance with this section ensure regulatory compliance according to the law. US EPA guidelines for Identification and Listing of Hazardous Waste are listed in 40 CFR Parts 261. The product should not be allowed to enter the environment, drains, water ways, or the soil.
Disposal of container: Dispose of as unused product. Do not re-use empty containers.
Other considerations: Observe all federal, state and local regulations when disposing of the substance.

14. TRANSPORT INFORMATION

DOT (US)

UN number:	Proper Shipping Name:	Class or Division:	Packing Group:
UN2291	Lead compounds, soluble, n.o.s	6.1 Toxic material.	III

IATA

UN number:	Proper Shipping Name:	Class or Division:	Packing Group:
UN2291	Lead compound, soluble, n.o.s	6.1 Toxic material.	III

IMDG

UN number:	Proper Shipping Name:	Class or Division:	Packing Group:
UN2291	Lead compound, soluble, n.o.s	6.1 Toxic material.	III

EmS number: F-A, S-A

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA 8b.):
This product is ON the EPA Toxic Substances Control Act (TSCA) inventory.

US Federal Regulations

CERCLA Hazardous substance and Reportable Quantity:

SARA 313:	Not Listed
SARA 302:	Not Listed

State Regulations

State Right-to-Know

Massachusetts	Listed
New Jersey	Listed
Pennsylvania	Listed
California Proposition 65:	Not Listed

Other Information

NFPA Rating:		HMIS Classification:	
Health:	3	**Health:**	3
Flammability:	0	**Flammability:**	0
Instability:	0	**Physical:**	0

International Inventories

Canada: DSL	On DSL
EC-No:	231-845-5

16. OTHER INFORMATION

Revision date: 07/06/2018
Revision number: 1

TCI chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its affiliates or subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our SDS are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated SDS for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, face mask, fume hood). For proper handling and disposal, always comply with federal, state and local regulations.