SAFETY DATA SHEET

Revision Date: 07/03/2022
Revision #: 3

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier
Product Name: Perovskite Precursor Ink for Air Processing
REACH Registration No.: Not applicable.

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified Use(s): PC21 Laboratory chemicals, Research and development use only

1.3 Details of the supplier of the safety data sheet
Company Identification: Ossila Limited
Address of Supplier: Solpro Business Park
Windsor Street
Sheffield
Postal code: S4 7WB, UK
Telephone: +441142999180
E-mail: info@ossila.com
Office hours: 08:00 - 17:00

1.4 Emergency telephone number
Emergency Phone #: +44 (0) 20 3885 0382 (CHEMTREC)

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Regulation (EC) No. 1272/2008 (CLP)
Flam. Liq. 3: Flammable liquid and vapour
Acute Tox. 4: Harmful if swallowed.
Acute Tox. 4: Harmful in contact with skin.
Acute Tox. 4: Harmful if inhaled
Eye Irrit. 2: Causes serious eye irritation
Repr. 1A: May damage fertility or the unborn child
STOT RE 2: May cause damage to organs through prolonged or repeated exposure
Aquatic Acute 1: Very toxic to aquatic life
Aquatic Chronic 1: Very toxic to aquatic life with long lasting effects

2.2 Label elements
According to Regulation (EC) No. 1272/2008 (CLP)
Product Name: Perovskite Precursor Ink for Air Processing
Hazard Pictogram(s):

<table>
<thead>
<tr>
<th>GHS02</th>
<th>GHS07</th>
<th>GHS08</th>
<th>GHS09</th>
</tr>
</thead>
</table>

Signal Word(s): Danger

Hazard Statement(s):
H226: Flammable liquid and vapour
H302+H312+H332: Harmful if swallowed, in contact with skin or if inhaled
H319: Causes serious eye irritation
H360D: May damage the unborn child. Suspected of damaging fertility
H373: May cause damage to organs through prolonged or repeated exposure
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects

Precautionary Statement(s):
P201: Obtain special instructions before use.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273: Avoid release to the environment.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313: IF exposed or concerned: Get medical advice/attention.
2.3 Other hazards
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

2.4 Additional Information
Not applicable.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
This product is a mixture.

3.2 Mixtures

<table>
<thead>
<tr>
<th>Hazardous ingredient(s)</th>
<th>CAS No.</th>
<th>EC No.</th>
<th>%W/W</th>
<th>Hazard Statement(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-dimethylformamide</td>
<td>68-12-2</td>
<td>200-679-5</td>
<td>&gt;= 60 - &lt;65</td>
<td>Flam. Liq. 3 H226  Repr. 1B H360D  Acute Tox. 4 H332  Acute Tox. 4 H312  Eye Irrit. 2 H319</td>
</tr>
<tr>
<td>Component included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methylammonium iodide</td>
<td>14965-49-2</td>
<td>239-037-4</td>
<td>&gt;= 20 - &lt;25</td>
<td>Acute Tox. 4 H302  Eye Irrit. 2 H319  Skin Irrit. 2 H315  STOT SE 3 H335</td>
</tr>
<tr>
<td>Lead dichloride</td>
<td>7758-95-4</td>
<td>231-845-5</td>
<td>&gt;= 10 - &lt;15</td>
<td>Repr. 1A H360Df  Acute Tox. 4 H332  Acute Tox. 4 H302  Stot RE 2 H373 (C ≥ 0,5 %)  Aquatic Acute 1 H400  Aquatic Chronic 1 H410</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General Advice
First aiders should ensure they have taken adequate steps to protect themselves from exposure (see Section 8 for recommended personal protection equipment).
Show this safety data sheet to the doctor in attendance.

Inhalation
Remove person to fresh air and keep comfortable for breathing. If not breathing give artificial respiration. Call a POISON CENTER or doctor/physician.

Skin Contact
Wash with soap and flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a POISON CENTER or doctor/physician.

Eye Contact
Flush with copious amounts of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a POISON CENTER or doctor/physician.

Ingestion
Immediately call a POISON CENTER or doctor/physician. Rinse mouth. Do NOT induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

Lead salts have been reported to cross the placenta and to induce embryo- and feto- mortality. They also have teratogenic effect in some animal species. No teratogenic effects have been reported with exposure to organometallic lead compounds. Adverse effects of lead on human reproduction, embryonic and fetal development, and postnatal (e.g., mental) development have been reported. Excessive exposure can affect blood, nervous, and digestive systems. The synthesis of hemoglobin is inhibited and results in anemia. If left untreated, neuromuscular dysfunction, possible paralysis, and encephalopathy can result. Additional symptoms of overexposure include: joint and muscle pain, weakness of the extensor muscles (frequently the hand and wrist), headache, dizziness, abdominal pain, diarrhea, constipation, nausea, vomiting, blue line on the gums, insomnia, and metallic taste. High body levels produce increased cerebrospinal pressure, brain damage, and stupor leading to coma and often death.

Warning: intolerance for alcohol can occur up to 4 days after dimethylformamide exposure. N,N-dimethylformamide is considered to be a potent liver toxin. Vomiting, Diarrhoea, Abdominal pain, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed
Treat symptomatically.
SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable Extinguishing media: As appropriate for surrounding fire.
Unsuitable extinguishing media: As appropriate for surrounding fire.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Nitrogen oxides (NOx)
Hydrogen chloride gas
Lead oxides

5.3 Advice for firefighters
Firefighters should wear complete protective clothing including self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Follow safe handling advice and personal protective equipment recommendations (as per section 8). Provide adequate ventilation.

6.2 Environmental precautions
Avoid release to the environment.

6.3 Methods and material for containment and cleaning up
Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections
See Also Section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Advice on safe handling: Avoid inhalation, ingestion, and contact with skin and eyes. Use only in a well-ventilated area. Wear protective clothing as per section 8.

Hygiene measures: Keep away from food and drink. Wash hands after handling, before breaks, and at the end of workday.

7.2 Conditions for safe storage, including any incompatibilities
Storage temperature: Ambient.
Storage life: Product is air and moisture sensitive. Handle and store under inert gas.
Incompatible materials: None known.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
8.1.1 Occupational Exposure Limits

<table>
<thead>
<tr>
<th>SUBSTANCE.</th>
<th>CAS No.</th>
<th>LTEL (8 hr TWA ppm)</th>
<th>LTEL (8 hr TWA mg/m³)</th>
<th>STEL (ppm)</th>
<th>STEL (mg/m³)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>N,N-Dimethylformamide</td>
<td>68-12-2</td>
<td>5</td>
<td>15</td>
<td>10</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Lead dichloride</td>
<td>7758-95-4</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Region: EU
Source: EU Occupational Exposure Limits

Chemical Agents Directive - Annex II: Binding biological limit values

<table>
<thead>
<tr>
<th>SUBSTANCE.</th>
<th>CAS No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead dichloride</td>
<td>7758-95-4</td>
<td>Lead</td>
<td>0.7 mg/l</td>
<td>Blood</td>
</tr>
</tbody>
</table>

Remarks: Biological monitoring must include measuring the blood-lead level (PbB) using absorption spectrometry or a method giving equivalent results. Medical surveillance is carried out if: - exposure to a concentration of lead in air is greater than 0.075 mg/m³, calculated as a time-weighted average over 40 hours per week, or - a blood-lead level greater than 40 μg Pb/100 ml blood is measured in individual workers. Practical guidelines for biological monitoring and medical surveillance must be developed in accordance with article 12, paragraph 2. These include recommendations of biological indicators (e.g. ALAU, ZPP, ALAD) and biological monitoring strategies.
8.2 Exposure controls

8.2.1. Appropriate engineering controls
Ensure adequate ventilation and/or exhaust. A washing facility/water for eye and skin cleaning purposes should be present.

8.2.2. Personal protection equipment
Eye Protection
Wear eye protection with side protection tested and approved under appropriate government standards such as EN166 (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use and proper glove removal techniques should be used. The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

Body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.

Thermal hazards
None known.

8.2.3. Environmental Exposure Controls
Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties
Physical State
Liquid.

Colour
Yellow.

Odour
Not known.

Melting point/freezing point
-61.4–61 °C (DMF)

Initial boiling point and boiling range
152–153 °C (DMF)

Flammability
Not known.

Lower and upper explosion limit
Not known.

Flash Point
57.5 °C – closed cup (DMF)

Auto-ignition temperature (°C)
Not known.

Decomposition temperature (°C)
Not known.

pH
Not known.

Kinematic viscosity
Not known.

Solubility(ies)
Solubility (Water): ca. 1 000 g/L (DMF)
Solubility (Other): alcohol, ether, acetone (> 1 000 - <= 10 000 mg/L) (DMF)

Partition coefficient: n-octanol/water (log value)
logPow : -0.85 (DMF)

Vapour pressure
3.77 hPA (20 °C) (DMF)

Density
0.94 g/cm3 at 20 °C (DMF)

Relative density
Not known.

Relative vapour density
Not known.

Particle characteristics
Not known.

9.2 Other information
None.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity
None anticipated.

10.2 Chemical Stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Not known.

10.4 Conditions to avoid
Not known.

10.5 Incompatible materials
Not known.

10.6 Hazardous decomposition products
In the event of fire: see Section 5

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity - Ingestion
No data available.

Acute toxicity - Skin Contact
No data available.

Acute toxicity - Inhalation
No data available.

Skin corrosion/irritation
No data available.

Serious eye damage/irritation
No data available.

Skin sensitization data
No data available.

Respiratory sensitization data
No data available.

Germ cell mutagenicity
No data available.

Carcinogenicity
No data available.
Reproductive toxicity  No data available.
Lactation  No data available.
STOT - single exposure  No data available.
STOT - repeated exposure  No data available.
Aspiration hazard  No data available.

11.2 Information on other hazards
11.2.1 Endocrine disrupting properties  None known.
11.2.2 Information on other hazards  None known.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity  No data available.
Toxicity - Aquatic invertebrates  Not known.
Toxicity - Fish  Not known.
Toxicity - Algae  Not known.
Toxicity - Sediment Compartment  Not known.
Toxicity - Terrestrial Compartment  Not known.

12.2 Persistence and Degradation  Not known.

12.3 Bioaccumulative potential  Not known.

12.4 Mobility in soil  Not known.

12.5 Results of PBT and vPvB assessment  This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties  Not known.

12.7 Other adverse effects  Not known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods  Dispose of contents in accordance with local, state or national legislation. Recycle only completely emptied packaging. Normal disposal is via incineration operated by an accredited disposal contractor. Send to a licensed recycler, reclamer or incinerator.

13.2 Additional Information  Disposal should be in accordance with local, state or national legislation.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number  UN No. 1992
14.2 UN proper shipping name  UN proper shipping name Flammable liquid, toxic, n.o.s. (N,N-dimethylformamide, lead dichloride solution)
14.3 Transport hazard class(es)  ADR/RID 3 (6.1)
IMDG 3 (6.1)
IATA 3 (6.1)

14.4 Packing group  Packing group III

14.5 Environmental hazards  Environmental hazards Classified as a Marine Pollutant.

14.6 Special precautions for user  Special precautions for user Not known.

14.7 Maritime transport in bulk according to IMO instruments  Not known.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture  European Regulations - Authorisations and/or Restrictions On Use
Candidate List of Substances of Very High Concern for Authorisation
REACH: ANNEX XIV list of substances subject to authorisation  Certain components listed (N,N-Dimethylformamide)
Not listed
**SAFETY DATA SHEET**  
Revision Date: 07/03/2022  
Revision #: 3

REACH: Annex XVII Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles  
Community Rolling Action Plan (CoRAP)  
Regulation (EC) N° 1005/2009 on substances that deplete the ozone layer  
National regulations  
Other  

<table>
<thead>
<tr>
<th>15.2 Chemical Safety Assessment</th>
</tr>
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<tbody>
<tr>
<td>A REACH chemical safety assessment has not been carried out.</td>
</tr>
</tbody>
</table>

**SECTION 16: OTHER INFORMATION**

The following sections contain revisions or new statements:

**LEGEND**

<table>
<thead>
<tr>
<th>Acronyms</th>
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<tbody>
<tr>
<td>ADN : European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways</td>
</tr>
<tr>
<td>ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road</td>
</tr>
<tr>
<td>CAS : Chemical Abstracts Service</td>
</tr>
<tr>
<td>CLP : Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures</td>
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<tr>
<td>DNEL : Derived No Effect Level</td>
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<td>EC : European Community</td>
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<td>EINECS : European Inventory of Existing Commercial Chemical Substances</td>
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<td>IATA : International Air Transport Association</td>
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<td>IBC : Intermediate Bulk Container</td>
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<td>ICAO : International Civil Aviation Organization</td>
</tr>
<tr>
<td>IMDG : International Maritime Dangerous Goods</td>
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<tr>
<td>LTEL : Long term exposure limit</td>
</tr>
<tr>
<td>PBT : Persistent, Bioaccumulative and Toxic</td>
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<tr>
<td>PNEC : Predicted No Effect Concentration</td>
</tr>
<tr>
<td>REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals</td>
</tr>
<tr>
<td>RID : Regulations concerning the International Carriage of Dangerous Goods by Rail</td>
</tr>
<tr>
<td>STEL : Short term exposure limit</td>
</tr>
<tr>
<td>STOT : Specific Target Organ Toxicity</td>
</tr>
<tr>
<td>SVHC : Substances of Very High Concern</td>
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<tr>
<td>UN : United Nations</td>
</tr>
<tr>
<td>vPvB : very Persistent and very Bioaccumulative</td>
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<thead>
<tr>
<th>Disclaimers</th>
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<tbody>
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