SECTION 1: IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

1.1 Product identifiers

Product Name : ACS Material Zinc Oxide Nanowire
Brand : ACS Material LLC
CAS-No. : 1314-13-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : ACS MATERIAL LLC
959 E Walnut St., Suite 100
Pasadena, CA 91106
USA
Telephone : +1 (866) 227-0656
Fax : +1 (781) 518-0284

1.4 Emergency telephone number

Emergency Phone #: +1 (866) 227-0656

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word : Warning
Hazard statement(s)
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P273 Avoid release to the environment
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.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Substance name: ACS Material Zinc Oxide Nanowire
Synonyms: ZnO nanowire
CAS-No.: 1314-13-2
Formula: OZn

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc oxide</td>
<td>&lt;=100%</td>
<td>1314-13-2</td>
</tr>
</tbody>
</table>

For the full text of the phrases mentioned in this Section, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If inhaled, remove to fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.
4.3 Indication of any immediate medical attention and special treatment needed
No data available.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Zinc/zinc oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

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
8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Impervious clothing, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

1) Appearance
   Form: Powder
   Colour: White

2) Odour
   No data available

3) Odour Threshold
   No data available

4) pH
   No data available

5) Melting point/freezing point
   No data available

6) Initial boiling point and boiling range
   No data available

7) Flash point
   Not applicable
9.2 Other safety information
No data available.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity
No data available.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available.

10.4 Conditions to avoid
No data available.

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides.
Other decomposition products - No data available.
In the event of fire: see section 5.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 7,950 mg/kg(Zinc oxide)
LC50 Inhalation - Mouse - 2,500 mg/m³ (Zinc oxide)

**Skin corrosion/irritation**
Skin - Rabbit (Zinc oxide)
Result: Mild skin irritation - 24 h

**Serious eye damage/eye irritation**
Eyes - Rabbit (Zinc oxide)
Result: Mild eye irritation - 24 h
Eyes - Rabbit (Zinc oxide)
Result: Mild eye irritation - 24 h.

**Respiratory or skin sensitisation**
No data available.

**Germ cell mutagenicity**
Hamster (Zinc oxide)
Embryo
Unscheduled DNA synthesis
Hamster (Zinc oxide)
Embryo
Morphological transformation.

Hamster (Zinc oxide)
Embryo
Sister chromatid exchange (Zinc oxide)
Guinea pig
Unscheduled DNA synthesis

**Carcinogenicity**
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**Reproductive toxicity**

**Specific target organ toxicity - single exposure**
No data available (Zinc oxide)

**Specific target organ toxicity - repeated exposure**
No data available.

**Aspiration hazard**
No data available.

**Additional Information**
RTECS: Not available.
Zinc oxide dust or fume can irritate the respiratory tract. Prolonged skin pox. Exposure to high levels of dust or fume can cause metallic taste, ma and nausea followed by fever and chills. Severe overexposure may result i, prolonged or repeated exposure can cause:, Reversible liver enzyme abnormalities., Diarrhoea (Zinc oxide)
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. (Zinc oxide)

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to fish  LC50 - Oncorhynchus mykiss (rainbow trout) - 1.1 mg/l - 96.0 h (Zinc oxide)
Toxicity to daphnia and other aquatic invertebrates  EC50 - Daphnia magna (Water flea) - 0.098 mg/l - 48 h (Zinc oxide)

12.2 Persistence and degradability
No data available.

12.3 Bioaccumulative potential
No data available.

12.4 Mobility in soil
No data available.

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 Other adverse effects
Very toxic to aquatic life.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Dissolve or mix the material with a combustible solvent and burn in a chem scrubber.

Contaminated packaging
Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION

UN number
ADR/RID: 3077  IMDG: 3077  IATA: 3077

UN proper shipping name
ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc oxide)
IATA: Environmentally hazardous substance, solid, n.o.s. (Zinc oxide)

Transport hazard class(es)
ADR/RID: 9  IMDG: 9  IATA: 9
Packaging group
ADR/RID: III | IMDG: III | IATA: III

Environmental hazards
ADR/RID: yes | IMDG Marine pollutant: no | IATA: yes

Special precautions for user

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

HMIS Classification
Health hazard: 0
Chronic Health Hazard: 0
Flammability: 0
Physical Hazard: 0

NFPA Rating
Health hazard: 0
Fire Hazard: 0
Reactivity Hazard: 0

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