

MATERIAL SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Revision number: 1

Revision date: 17/05/2017

1. Identification of the substance/mixture and of the company/undertaking

1.1. Product Details

Product Code : M911-M912
Name : Multilayer graphene
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration or the annual tonnage does not require a registration.
CAS No. : 7782-42-5 (graphite) / 1034343-98-0 (graphene)

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

Identified uses : Laboratory chemicals

1.3. Supplier details

Supplied by : Ossila Limited
Kroto Innovation Centre
Broad Lane, Sheffield
S3 7HQ, UK
Telephone : 0114 213 2770
Email address : info@ossila.com

2. Hazards identification

2.1. Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.

Substance properties have been derived from graphite (bulk substance); the properties of the single/few-layer nanomaterial are under evaluation and to some extent not known.

2.2. Label elements

No label required.

2.3. Other hazards

Electrically conductive material; avoid accumulation of dusts or powders where this could cause shorting of electrical circuits or components.

3. Composition/Information on ingredients

3.1. Substances

Synonyms : Few-layer graphene, graphene
Formula : C_xH_y
Molecular weight : n/a
CAS No. : 7782-42-5 (graphite) / 1034343-98-0 (graphene)

Graphene is an allotrope of carbon, with a single plane of carbon atoms sp^2 bonded together. Layers of graphene on top of each other form the carbon allotrope graphite.

No components need to be disclosed according to the applicable regulations.

4. First aid measures

4.1. Description of first aid measures

After Inhalation

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

After skin contact

In case of skin contact, wash with soap and flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

After eye contact

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

After Ingestion

If swallowed, wash out mouth with water. Call a physician.

4.2. Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in section 11.

4.3. Indication of any immediate medical attention and special treatment needed

Contact a poison centre immediately in case of ingestion or inhalation of a large amount of product.
No specific treatment.

5. Fire fighting

5.1. Extinguishing media

Suitable extinguishing media: Dry chemical, alcohol-resistant foam, carbon dioxide or water spray. Consult with local fire authorities before attempting large scale fire fighting operations.

5.2. Special hazards arising from the substance of mixture

Hazardous combustion products: Carbon oxides.

5.3. Advice for firefighters

Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protective equipment (section 8). Avoid dust formation. Ensure room is well ventilated.

6.2. Environmental precautions

Do not let product enter drains.

6.3. Containment and cleaning:

Contain and clean up spill if safe to do so using an electrically protected vacuum cleaner or by wet-brushing. Dispose of dry waste in closed container for proper disposal according to local regulations.

7. Handling and storage

7.1. Precautions for safe handling

Avoid formation of dust and aerosols. Provide exhaust ventilation in places where dust is formed.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry and well-ventilated place inside of a tightly sealed container. Reseal containers that have been opened and keep upright to prevent leakage.

7.3. Specific end uses

Use in laboratories.

8. Exposure controls / Personal protection

8.1. Control parameters

Exposure limit sources

UK – EH40 Workplace Exposure Limits (WEL).

Components with workplace control parameters

| Component | CAS # | Control parameters |
|----------------------------|-----------|----------------------------|
| Graphite – inhalable dust | 7782-42-5 | 10 mg/m ³ (TWA) |
| Graphite – respirable dust | 7782-42-5 | 4 mg/m ³ (TWA) |

TWA - time weighted average; STEL - Short Term Exposure Limit

Inhalable dust is the fraction of material that is available for deposition in the respiratory tract; respirable dust is the fraction that penetrates the gas exchange region of the lung.

Biological occupational exposure limits

This product does not contain any hazardous materials with biological limits.

8.2. Exposure controls

Engineering measures

Handle in accordance with good industrial engineering/laboratory practices for hygiene and safety. Ensure eyewash stations and safety showers are close to the laboratory workstation. Ensure good general ventilation is present when handling the product.

Personal protective equipment

Eyes: Wear safety glasses with side-shields conforming to appropriate government standards such as NOISH (US) or EN166 (EU).

Skin: Handle with appropriate gloves and use proper glove removal technique to avoid skin contact. Dispose of gloves in accordance with applicable laws. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Clothing: Wear complete suit protecting against chemicals; the type of equipment should be appropriate for the concentration and amount of dangerous substance used.

Respirators: Where protection from nuisance dusts is needed, use type N95 (US) or type P1 (EN 143) dust masks or those approved under appropriate government standards such as NIOSH (US) or CEN (EU).

General hygiene measures

Wash thoroughly after handling. Wash contaminated clothing before reuse.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | | |
|--|---|--------------------------|
| Appearance | : | Black/grey powder/flakes |
| Odour | : | Odourless |
| Odour threshold | : | No data available |
| pH | : | No data available |
| Melting/freezing point | : | No data available |
| Boiling point/range | : | No data available |
| Flash point | : | No data available |
| Evaporation rate | : | No data available |
| Flammability | : | No data available |
| Explosive limits | : | No data available |
| Vapour pressure | : | No data available |
| Vapour density | : | No data available |
| Relative density | : | No data available |
| Solubility(ies) | : | No data available |
| Partition coefficient: <i>n</i> -octanol/water | : | No data available |
| Autoignition temperature | : | No data available |
| Decomposition temperature | : | No data available |
| Viscosity | : | No data available |
| Explosive properties | : | No data available |
| Oxidising properties | : | No data available |

9.2. Other safety information

No data available.

10. Stability and reactivity

10.1 Reactivity

No data available.

10.2. Chemical stability

Stable under normal temperatures and pressures 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 oxidising agents.

10.6. Hazardous decomposition products

No known hazardous decomposition products.

11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity

No data available.

Skin corrosion/irritation

No data available.

Serious eye damage/eye irritation

May cause eye irritation.

Respiratory or skin sensitization

May cause irritation to skin and respiratory tract.

Germ cell mutagenicity

No data available.

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

No data available.

Specific target organ toxicity - single exposure

No data available.

Specific target organ toxicity - repeated exposure

No data available.

Aspiration hazard

No data available.

Routes of exposure

Eye contact, ingestion, inhalation, skin contact.

Signs and Symptoms of Exposure

No data available.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. Ecological information

12.1. Toxicity

No data available.

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

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6. Other adverse effects

No data available.

13. Disposal

13.1. Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state and local environmental regulations and directives on waste and hazardous waste. Offer surplus material to a licensed professional waste disposal professional.

Contaminated packaging

Dispose of as unused product.

14. Transport

Non-hazardous for road, air and sea transport.

IATA: Not regulated as a hazardous material.

IMO: Not regulated as a hazardous material.

RID/ADR: Not regulated as a hazardous material.

15. Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006, the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

No data available.

15.2 Chemical safety assessment

No chemical safety report/assessment was carried out for this product.

16. Other information

Warranty

This material is for research and development use only. The information provided here is based upon the available information from material suppliers but not warranted as complete and is provided only as a guide. Ossila Limited shall not be held responsible for any damage resulting from use or handling of this product.