

SAFETY DATA SHEET

GRAPHENE OXIDE - POWDER / PASTE

1 Identification of the chemical hazardous substance / mixture and of the company / undertaking

1.1 Name of the chemical substance: Graphene Oxide.

1.2 Other means of identification: Graphite Oxide, Oxidized Graphite, Oxidized Graphene.

1.3 Recommended uses of the hazardous chemical mixture, and restrictions on use:

- For scientific and technological research.
- Additive for design and development of products for different industries.
- Not suitable for human consumption.

1.4 Details of the supplier or manufacturer:

Supplier Name : Stanford Advanced Materials
Address : 23661 Birtcher Dr., Lake Forest, CA 92630
Telephone U.S.A. : (949)407-8904
Fax : (949) 812-6690
Emergency : (949)407-8904
Web site : <https://www.samaterials.com/>

2 Hazards identification


2.1 Classification of the hazardous chemical substance or mixture.

The product in its current presentation is not classified as dangerous according to the GHS.

Acute oral toxicity	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2

Classification according to EU Directives 67/548/EEC or 1999/45/EC

2.2 Signaling elements of the GHS, including precautionary advice and precautionary pictograms.

SGA07	Hazard class	Category	Pictogram	Signal word
Health Hazard	Acute toxicity (Oral, skin, inhalation)	4		Attention

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Identification code: H

Code	Hazard statement
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H303	May be harmful if swallowed.
H333	May be harmful if inhaled.
H335	It can irritate the respiratory tract.

Identification code: P

Code	Precautionary advice
P261	Avoid breathing dusts / fumes / gases / mists / vapours / aerosols
P262	Wash hands thoroughly after handling
P264	Wash face, hands, and exposed skin thoroughly after handling.
P280	Wear gloves, protective clothing, eye and face protection equipment.
P272	Contaminated work clothing must not leave the workplace.
P312	Call a poison control center or doctor if you feel unwell.
P332 + P313	If skin irritation occurs: Get medical advice / attention.
P305 +P351 +P338	In case of contact with eyes: Rinse carefully with water for several minutes. Remove contact lenses, if you have them and it is easy to do so. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice / attention.

2.3 Other hazards not classified.

No data available.

3 Composition / Information on ingredients

3.1 For substances.

Graphene Oxide

Components	CAS No.	EC No.	%
Graphene Oxide	7782-42-5	947-768-1	60-100
Stabilizers	-	-	5-30

3.2 For mixtures.

Not applicable

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4 First aid measures

4.1 Description of first aid measures.

Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
Skin contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Ingestion	If large quantity is consumed, seek medical attention.
Inhalacion	Move to fresh air. If symptoms persist, call a physician.
Protection of First-aiders	Use personal protective equipment.

4.2 Most important symptoms and effects, acute and chronic.

Acute: No data available.

Chronic: No data available.

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

Notes to physician: Treat symptomatically

5 Fire-fighting measures

5.1 Suitable Extinguishing Media.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment, such as CO₂, extinguishing powder or water spray.

Fight larger fires with water spray.

- Extinguishing media which shall not be used for safety reasons. No data available.

5.2 Specific dangers of the hazardous chemical substance or mixture.

In case of fire, the following may be released: Carbon monoxide, carbon dioxide

- Special Hazard. None

5.3 Special measures to be followed by fire-fighting groups.

- Special protective equipment for fire-fighters.

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA Flammability 0

HMIS Flammability 0

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6 Measures to be taken in case of accidental spill or leak

6.1 Personal precautions, protective equipment and emergency procedures:

Use personal protective equipment. Avoid contact with skin and eyes.

- Collect and dispose of with absorbent material.
- Ventilate and clean the spill/splash area with water.
- Do not breathe vapors or aerosols.
- Store in appropriate and closed containers for disposal.

See Section 12 for additional information.

6.2 Environmental precautions.

Prevent entry into waterways, sewers, basements, or confined areas.

6.3 Methods and materials for the containment and cleaning of spills and leaks.

Prevent further leakage or spillage if safe to do so.

- Use personal protective equipment. Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Take up mechanically and collect in suitable container for disposal. Avoid dust formation. Clean contaminated surface thoroughly. Sweep up and shovel into suitable containers for disposal.

7 Handling and storage

7.1 Precautions for safe handling.

- Handle in accordance with good industrial hygiene and safety practice.
- Avoid contact with eyes and skin, avoid breathing dust, ensure adequate ventilation.
- Wear personal protective equipment, in case of insufficient ventilation, wear suitable respiratory equipment.

7.2 Conditions for safe storage, including any incompatibilities.

- Although graphene oxide does not present any risk of flammability or explosion, it must be stored tightly closed in a dry, cool, and ventilated place protected from direct sunlight.
- Store away from oxidizing agents, halogens, acids, flammable and explosive substances.
- Take measures to prevent the accumulation of electrostatic discharges.
- Keep out of the reach of children.

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8 Exposure Controls / Personal Protection

8.1 Control parameters.

- **Exposure limits:** Contains no substances with occupational exposure limit values.

Components	CAS No.	Control parameters
Graphene Oxide (inhalable dust)	7782-42-5	TWA:10 mg/m ³
Graphene Oxide (respirable dust)	7782-42-5	TWA:4 mg/m ³

Inhalable dust is the fraction of material that is available to be deposited in the respiratory tract; respirable dust is the fraction that enters the gas exchange region of the lung.

8.2 Appropriate technical controls.

Showers, eyewash stations and ventilation systems. Use only with adequate ventilation to keep airborne levels of dust below recommended exposure limits.

8.3 Individual protection measures, such as personal protective equipment, PPE.

Eye Protection	Tightly fitting safety goggles. ANSI 787 rated safety glasses with side shields.
Respiratory protection	NIOSH N-100 or P-100 rated particulate respirator.
Hand protection	Nitrile gloves or equivalent and protective clothing to avoid contact with the skin, such as cotton, fiber lab coat or uniform.
Skin and body protection	Select a protection for the body according to the quantity and concentration of the product to be used.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice.
Environmental exposure controls	Do not allow material to contaminate ground water system.

9 Physical and chemical properties

Physical state: According to the presentation: paste or powder	Melting Point: No data available
Colour: Black	Flash point: No data available
Odor: No data available	Decomposition temperature: No data available
Powder density: 0.35 g/cm ³	Autoignition temperature: No data available
Paste density: 1.12 g/cm ³	Flammability: No data available
Powder moisture: 10 - 15%	Partition coefficient n- octanol/water: No data available
Paste moisture: 30-35%	Oxidising properties: No data available
pH: 3.0 - 7.0	Molecular Weight: No data available
Exfoliated particle size: 1.0-5.0 µm ± 0.5 µm	Vapor Pressure: No data available
Solubility: Soluble in water	

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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: Extreme temperatures.

10.5 Incompatible Materials: Strong oxidizing agents, halogens, and acids.

10.6 Hazardous Decomposition Products: No data available.

11 Toxicological information

No experimental data is available of the product itself regarding toxicological properties.

**11.1 Information on the probable routes of entry,
11.2 Symptoms related to the physical, chemical and toxicological characteristics,
11.3 Immediate and delayed effects, as well as chronic effects produced by short or long-term exposure.**

Acute toxicity

Inhalation. May be harmful if inhaled. Inhalation of dust in high concentration may cause irritation of respiratory system.

Eye contact. Dust contact with the eyes can lead to mechanical irritation.

Skin contact. May cause slight skin irritation.

Ingestión. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic toxicity

Sensitization. No data available.

CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction).

No data available.

Specific Target Organ Systemic Toxicity- Single Exposure.

No data available.

Specific Target Organ Toxicity-Repeated Exposure.

No data available.

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11.4 Numerical measures of toxicity (such as acute toxicity estimates).

DL50 Oral (rat): >2000 mg/kg. Estimated graphite.

LD50 Dermal. Undetermined.

CL50 Inhalation. Undetermined.

11.5 Interactive Effects. No data available.

11.6 Other information. No data available.

12 Ecotoxicological information

12.1 Toxicity: The chemical, physical and toxicological properties, as well as its effects on the environment have not been studied. Prevent product from coming into contact with wastewater, soil, aquifers.

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 Other adverse effects: No data available.

13 Disposal considerations

13.1 Disposal Methods.

The generation of waste should be avoided or minimized whenever possible.

- **Product:** Disposal of this product and any derivatives must comply with the requirements of environmental protection and waste disposal legislation and all local authority requirements.

- **Totally empty containers / packaging:** The contaminated substance and/or packaging must be disposed of as special waste through a specialized waste management company, in accordance with the requirements of environmental protection and waste disposal legislation and any requirements of national, regional, and local authorities.

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14 Transport information

14.1 UN number: Not regulated.

14.2 Proper Shipping Name: Not regulated

14.3 Transport related class: Not regulated

14.4 Packing group: Not regulated

14.5 Environmental risks: Not applicable

Ground transportation

ADR/RID:

Hazard class: Not regulated

Packing group: Not regulated

ID number: Not regulated

Hazard label: Not identified

Expedition technical determination: Not applicable

Marine transport

IMDG:

Hazard class: Not regulated

Packing group: Not regulated

ID number: Not regulated

Hazard label: Not identified

Expedition technical determination: Not applicable

Air Transport

IATA/ICAO:

Hazard class: Not regulated

Packing group: Not regulated

ID number: Not regulated

Hazard label: Not identified

Expedition technical determination: Not applicable

14.6 Special precautions for user: Non-flammable. Transport in closed containers that are upright and secure. The multimodal shipping description is provided for informational purposes and does not consider the container sizes. The shipping description for a particular means of transport does not mean that the product is properly packaged for this means of transport. Ensure that the people who transport the product know what to do in the event of an accident or spill.

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14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code:
Non relevant.

15 Regulatory information

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

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006. Registration, Evaluation, Authorization and Restriction of Chemical Products (REACH) and NOM-018-STPS-2015.

Chemical safety assessment: A chemical safety assessment of the product has not been carried out.

16 Other information including that relating to the preparation and updating of safety data sheets

Risk Combination Phrases.

R36 / 37 / 38 - Irritating to eyes, respiratory system, and skin.

Hazard Statements.

H320 - Causes eye irritation. H316 - Causes mild skin irritation. H303 - May be harmful if swallowed. H333 - May be harmful if inhaled. H335 - May cause respiratory irritation.

Legal Note

The information contained in this document is considered correct and is not intended to be exhaustive, so it should only be used as guide. It is based on the current state of our knowledge and is applicable to the product with respect to appropriate safety precautions. This safety data sheet does not represent a guarantee of the properties of the product.

The toxicological properties of the product described have not been studied in depth, therefore, generic data on graphite, the main raw material for the production of graphenic materials, has been used to prepare this safety data sheet. Users must be trained for the correct interpretation of the technical information, as well as for the use, storage and disposal of the product.

Energeia Fusion, S.A. de C.V., is not responsible for the damages resulting from the incorrect interpretation of the information in this document, as well as the improper handling of the described product.

For more information contact contact@graphenemex.com

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