

MATERIAL SAFETY DATA SHEET
Graphene Oxide GO - Graphite Nanopowder

Date of preparation: 07/02/2014

Revised: 15/10/2018

1. PRODUCT

Product Name: Graphite nanopowder (**GO**)

(Few Layer Flake Graphene, Graphene Oxide powder or water suspension)

REACH No: the registration number for this material is not available, because this material is exempt from registration due to the volume of annual turnover.

Chemical Name and Type of Substance: **Synthetic Graphite.**

2. COMPANY IDENTIFICATION:

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3. Composition/Information on Ingredients:

Synthetic graphite: CAS No. 7782-42-5

Carbon content: ca. 45 wt.%.

Oxygen content: ca. 47 wt.%.

Hydrogen content: ca. 3 wt%.

Nitrogen content: ca. 0.1 %.

Inorganic contaminants: S ca. 2.5 wt.%, Ca ca. 1.0 wt.%, Mn ca. 0.5 wt.%, K ca. 0.3 wt.%.

Ash: < 2 wt. %.

4. Hazard identification

4.1. General information, first aid measures

Odorless product. Color from light brown to dark brown. Color of **GO** powder depends on degree of **GO** oxidation. For the **GO** aqueous suspension color depends on its concentration.

In case of contamination: remove contaminated clothing, wash with usual detergents.

In the case of swallowing: rinse mouth thoroughly with water, seek medical advice.

In case of an inhale: injured person, if it is breathing, transfer to fresh air. If the person is not breathing, use artificial respiration, call immediately doctor.

In case of skin contact: wash with plenty of water with soap or shampoo.

In case of allergic reaction - seek medical advice.

In case of contact with eyes: rinse with a lot of lukewarm water for 5-10 minutes, in case of allergic reaction or serious eyes irritation, seek medical advice.

When using the product, work under the venting hood and wear protective clothing, face mask, gloves and glasses.

If you do not use moistened, powdery **GO** material, the best is to operate with it in the place intended for this purpose, preferably under venting hood.

The product does not create any threats to the environment.

4.2. Health threats

Contact with the digestive tract: the hazards are unknown, the product should not cause dangers if swallowed.

Contact with airways: dust from the product may cause irritation of the respiratory system.

Skin contact: the negative effects of the contact with the skin are unknown. Maybe cause moderate local irritation. It should not cause long-term effects skin irritation even at high concentrations. The preparation should not be absorbed through direct contact with the skin.

Eye contact: contact with eyes may cause moderate irritation due to the material in the form of powder. It should not cause long-term irritation.

5. Fire Fighting Measures

Emergency telephone number: 112; Fire Brigade 998; ambulance service 999

Use appropriate extinguishing media: water spray, foam, carbon dioxide.

Flash point: not marked.

Explosiveness limit: not marked.

Extinguishing media: carbon dioxide (CO₂), foams, powders, water.

Special procedures: not anticipated.

Combustion and decomposition products: carbon monoxide (CO), carbon dioxide (CO₂).

Protective equipment for extinguishing fire: specialist protective clothing and oxygen apparatus with a mask.

6. Proceeding in the case of release of material to the environment

Cover the spilled product and do not allow dust to be raised. You can cover it with sand.

Spilled powder or GO suspension collect into suitable containers and ventilate the room.

7. Handling and Storage

In general: store in sealed containers.

Handling the substance: avoid inhaling dust, contact with eyes and skin.

Storage: store in original, undamaged, sealed packages in places intended for this purpose.

GO powder reveals slight hygroscopic properties.

8. Personal protection

Skin protection: latex-coated protective gloves.

Respiratory protection: dust mask.

Eye protection: glasses used in chemical synthesis.

Face protection: full-face mask

9. Physicochemical Properties

Form and color: odorless product. Its color - from light brown to dark brown, color of GO powder depends on degree of GO oxidation. For GO aqueous solution its color depends on its concentration.

pH value: 5-7

Decomposition temperature: 180 – 220 °C

Bulk density of the powder: 0,8-1,5 g/cm³

Flash point of the powder: ok. 400 - 500 °C

Solubility in water: it creates aqueous suspension

Odor: odourless.

Evaporation rate: not applicable.

Explosive limit: no data available.

Oxidizing or reducing properties: very low, due to the present oxygen and carbon into

the GO structure.

10. Stability and reactivity

Stability: thermal decomposition or combustion result in the secretion of carbon monoxide (CO) and carbon dioxide (CO₂).

Materials to avoid: highly oxidizing and reducing agents

Conditions to avoid: avoid excessive heating.

The product does not enter into dangerous reactions with other materials.

11. Toxicological information

Orally for rats LD50 [mg/kg]: data not available.

Rabbit skin LD50 [mg/kg]: data not available.

Rat breathing: LD50 [mg/L/4h]: data not available.

Carcinogenicity: Non-carcinogenic.

Data on health risks: experiments do not show toxic effects on artificial skin.

Experiments with rats indicate potential toxicity of the material inhaled in a large amount.

Therefore, avoid inhaling dust and use previously mentioned personal protective equipments.

12. Ecological information

Environmental impact (eco-toxicity): the material should not reveal toxicity to the environment.

13. Waste management

The product GO is not dangerous. In small quantities can be stored on garbage dumps or destroyed by incineration. The volatile dust during combustion should be collected.

Liquids containing significant amounts of graphene oxide suspension should be filtered.

14. Transport rules

Graphite nanopowders (graphite, graphene oxide, reduced graphene oxide) is not subjected to classifications under the ADR RID, IMDG-Kod and IATA regulations, and thus restrictions on these regulations. It does not require special transport conditions, it is not dangerous cargo, it should only be protected against spillage, and not transported with food products.

15. Information on risk and safety

Risk index R: irritating to the respiratory system, eyes and skin (R 36-37-38).

Security index S: **S22** – avoid inhaling dust, **S29** – do not remove to the sewage system, **S 26-36-45** – use proper protective clothing, gloves and safety glasses (see EU Directive 1999/45/EC Annex V).

16. Legal regulations regarding safety, health and environment protection specific for the material

The material safety data sheet has been prepared on the basis of the following regulations: Ordinance (UE) No. 1907/2006 (Dz. U. L 396 z 30.12.2006) European Parliament and Council on the Registration, Evaluation, Authorization and Restrictions on REACH Chemicals. Ordinance (UE) No. 1272/2008 (Dz. U. L 353 z 30.12.2008) European Parliament and Council on the classification, labeling and packaging of substances and mixtures. Regulation of Health Minister on 05- 03- 2009 amending the Regulations on the

criteria and way of classification of substances and preparations (Dz. U. 2009, nr 43 poz.353). The Act of 27 April 2001 on waste (Dz. U. 2001, nr 62, poz. 628). Regulation of the Minister of Labor and Social Policy of 29/11/2002 in the case the highest permissible concentrations and intensities of factors harmful to health in work environment (Dz. U.2002 Nr 217, poz. 1833).
Chemical safety assessment - no data available.

17. Other information

NANOMATERIALS Leszek Stobiński provides the above information in good faith and reserves that the above information is not completely exhaustive and has been developed based on the available state of knowledge regarding the product in the form in which it is distributed and used. This document is intended only to introduce to proper safe handling of this material by a suitably qualified and trained person. The data contained in this safety data sheet do not constitute an assessment of the user's workplace safety. The safety data sheet cannot be considered as a guarantee of substance properties.

The user is solely responsible for determining the suitability of the product for specific purposes.

Due to the fact that the conditions and methods of material use are beyond our control, we are not responsible for the use of this product.

The safety data sheet is available upon request of a person running a professional activity.

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