

## MATERIAL SAFETY DATASHEET (MSDS)

### GRAPHENE POWDER

#### 1. Product and Company Identification

Product Name: TI- Graphene  
Synonyms: Graphene,  
Single-layer Graphene,  
Graphene sheets, Exfoliated  
Graphene., Functionalized Graphene  
CAS NO: 7782-42-5

Company: M/s. Techinstro  
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#### Composition/Information on Ingredients

**Ingredient:** Graphene  
**CAS No:** 77782-42-5  
**Amount:** >99.0%

#### 2. Hazards Identification

**Potential acute health effects:** slightly hazardous in skin contact (irritant), eye contact, ingestion, and inhalation.

**Potential chronic health effects:**

**Carcinogenic Effects:** Not available.

**Mutagenic Effects:** Not known.

**Teratogenic Effects:** Not known.

**Developmental toxicity:** The substance is toxic to the upper respiratory tract and cardiovascular system. Prolonged exposure can produce target organ damage.

#### 3. First Aid Measures

**Eyes:** Check and remove contact lenses. In case of contact, immediately wash your eyes with water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin:**

1. **Wash** with soap and water.
2. Cover the irritated skin with an emollient.
3. Get medical attention if irritation develops.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Severe Inhalation:** Not known

**Ingestion:**

In case of accidental ingestion:

1. "Please refrain from attempting to induce vomiting unless otherwise advised by a medical professional.
2. If the person is unconscious, seek medical attention.
3. Loosen tight clothing to assist breathing.

Serious Ingestion: Not available.

#### 4. Fire Fighting Measures

In general, Graphene is challenging to combust. Regular care should be taken to avoid dust explosion risk through high concentrations of dust or finely-suspended airborne particles, although Graphene dust is not usually considered an explosion hazard.

**Suitable Extinguishing Media:** water, carbon dioxide, dry chemical powder, or foam as appropriate for surroundings.

**Other Combustion Hazards:** in the event of combustion or thermal decomposition, this material may release carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), or other toxic gases at temperatures over 300°C. This material may react with potassium, sodium, rubidium, or cesium to create intercalation compounds that may ignite and react explosively with water.

#### 5. Accidental Release Measures

Spilled or released material should be collected mechanically and disposed of in suitable containers. Use care during cleanup to prevent the creation of concentrations of dust.

**Personnel:** Cleanup personnel should wear suitable protective equipment to prevent inhalation or skin contact. Cleanup personnel should be alert to the risk of slippage due to the material's low coefficient of friction.

**Environmental:** Do not discharge into storm or sanitary sewers or groundwater.

## 6. Handling and Storage

This substance is not combustible and remains stable at room temperature. This material should be stored in labeled, closed containers away from ignition or heat. Care should be taken to avoid accumulating dust since dust can form an explosive mixture. Graphene is electrically conductive. Care should be taken, therefore, to prevent accumulations of Graphene dusts or powders in places where these accumulations could cause shorting of electrical switches, circuits, or components.

**Advice on Safe Handling:** Provide good ventilation when handling. Personnel should take measures to avoid breathing dust created when handling and should wear suitable protective clothing to prevent skin and eye contact.

## 7. Exposure Controls, Personal Protection

### Exposure Guidelines

Graphene (CAS no. 7782-42-5) TWA: ACGIH (TLV): 2.0 mg/m<sup>3</sup> respirable

OSHA (PEL): 15 ml/m<sup>3</sup> respirable

Crystalline Silica (CAS no. 14808-60-7) TWA: ACGIH (TLV): 0.025 mg/m<sup>3</sup> respirable OSHA (PEL): 10 mg/m<sup>3</sup> respirable

## 8. Personal Protective Equipment

**Respiratory protection:** Protect against inhalation. Maintaining a respiratory protection program compliant with the applicable OSHA requirements is essential.

**Eye protection:** Protect against contact with eyes by wearing suitable safety eyeglasses, chemical protective goggles, or any other facial protection.

**Skin protection:** Protect skin contact by wearing protective gloves and suitable clothing.

### Engineering Controls

Provide adequate workplace ventilation. If dusts are generated through handling, local exhaust ventilation should be employed.

## 9. Physical and Chemical Properties

Physical state and appearance: Solid

Odor: Odorless

Taste: Tasteless

Molecular Weight: 12.01 g/mole

Color: Black

pH (1% soln/water): Not applicable

Boiling Point: Not available

Melting Point: 3650°C (6602°F)

Specific Gravity: Not available

Vapor Pressure: Not applicable

Vapor Density: Not available

Volatility: Not available  
Odor Threshold: Not available  
Water/Oil Dist. Coeff.: Not available  
Ionicity (in water): Not available  
Dispersion Properties: Not available  
Solubility: Insoluble in cold water

## 10. Stability & Reactivity

Stability: The product is stable  
Instability Temperature: Not known  
Conditions of Instability: Excess heat, incompatible materials  
This substance is highly reactive with oxidizing agents and may not be compatible with other substances.  
Corrosivity: Non-corrosive in the presence of glass

## 11. Special Remarks on Reactivity:

Reacts vigorously with liquid potassium and potassium peroxide. If Hydroxyl Functionalized Graphene contacts liquid potassium, rubidium, or cesium at 300°C, intercalation compounds may be formed.  
Special Remarks on Corrosivity: Not available  
Polymerization: Will not occur

## 12. Toxicological Information

**Routes of Entry:** Inhalation. Ingestion

### Toxicity to Animals:

LD50 (oral, rat): >2000mg/kg (Graphene)  
LC50 (inhalation, rat): Not available

### Chronic Effects on Humans:

Causes damage to the upper respiratory tract along with the cardiovascular system.  
**Other Toxic Effects on Humans:** Bit hazardous in skin contact, ingestion, or inhalation.  
**Special Comments on Toxicity to Animals:** Not available.  
**Special Comments on Chronic Effects on Humans:** Not known  
**Special Comments on Other Toxic Effects on Humans:** Nuisance dust.  
**Acute Potential Health Effects Skin:** Leads to skin irritation.  
**Eyes:** Dust causes eye irritation.  
**Inhalation:** This may be harmful if inhaled. Dust causes respiratory tract and mucous membrane irritation.  
**Ingestion:** May be harmful if swallowed. It may cause gastrointestinal (digestive) tract irritation with nausea and vomiting.  
**Chronic Potential Health Effects:** Inhalation of high concentrations of Hydroxyl Graphene dust over prolonged periods may cause pneumoconiosis. Symptoms can include cough, shortness of

breath, and decreased pulmonary function. Preexisting pulmonary disorders such as emphysema may be aggravated by long-term exposure to high concentrations of Hydroxyl Graphene dust. The toxicology of this substance has not been thoroughly investigated

### 13. Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available

**Products of Biodegradation:**

It is unlikely for any dangerous byproducts to form in the short term. However, long-term byproducts could emerge.

The product and its degradation products are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available

### 14. Disposal Considerations

**Waste Disposal:**

Waste must be disposed of by federal, state, and local environmental control regulations.

### Transport Information

**DOT Classification:** Not a DOT-controlled material (United States).

**Identification:** Not applicable

**Special Provisions for Transport:** Not applicable

### 15. Regulatory Information

Graphene (CAS no. 7782-42-5) is not listed as a hazardous material under US Federal regulations. It is not listed under the Clean Air Act, the Clean Water Act, SARA (section 302, section 311/312, or section 313), HAPS, or IARC.

Graphene (CAS no. 7782-42-5) is listed on:

US: TCSA Canada: DSL EC: EINECS

This product has WHMIS (Canada) classification D2A

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### 16. Other Information

**References:** Not available.

**Other Special Considerations:** Not available