

## MATERIAL SAFETY DATA SHEET (MSDS)

**Product Name:** Reduced Graphene Oxide

**Product Series:** Red-Graphox-001

### 1. Product and Company Identification

**Product Name:** TI- Reduce Graphene Oxide

**Synonyms:** Reduce Graphene oxide, Reduce Graphene oxide

**CAS NO.:** 7782-42-5 (Graphene)

#### **Our Full Address with contact no.**

Company: M/s. Techinstro

Plot No. - 463, Yadav Nagar

Nagpur, Maharashtra, India

Pin Code- 440026

Emergency Contact: +91(0) 8007799090

Emergency Contact Email: [info@techinstro.com](mailto:info@techinstro.com)

### 2. Composition/Information on Ingredients

**Material:** Reduce Graphene

**CAS registry no:** 7782-42-5

**Physical appearance:** Grey-black

### 3. Hazards Identification

**Potential acute health effects:** A bit hazardous in case of skin contact, eye contact, ingestion, or inhalation.

#### **Potential chronic health effects:**

**Carcinogenic Effects:** Not available. **MUTAGENIC EFFECTS:** Not known. **TERATOGENIC EFFECTS:** Not available.

**Developmental toxicity:** not available. The substance is toxic to the upper respiratory tract and may also harm the cardiovascular system. Repeated exposure to the substance can produce target organs.

### 4. First Aid Measures

**Eyes:** Check and remove contact lenses, if any. In case of contact, immediately flush 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 air. If not breathing, then give artificial respiration. If breathing is difficult, then give oxygen. Or else get medical attention.

**Severe Inhalation:** Not available

**Ingestion:**

Do not induce vomiting unless instructed by the doctor. Do not give anything by mouth to an unconscious person. If large quantities of the substance are swallowed, call a physician immediately. Loosen tight clothing.

Serious Ingestion: Not available.

## 5. Fire Fighting Measures

In general, reduced graphene Oxide is challenging to combust. Regular care should be taken to avoid dust explosion risks caused by high concentrations of dust or finely-suspended airborne particles. However, reduced graphene Oxide 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 300oC. This material may react with potassium, sodium, rubidium, or cesium to create intercalation compounds that may ignite and react explosively with water.

## 6. Accidental Release Measures

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

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

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

## 7. Handling and Storage

This material is stable at room temperature and has no significant risk of combustion. This material should be stored in labeled, closed containers away from ignition or heat. Care should be taken to avoid accumulating dust concentrations since any dust can form a potentially explosive mixture in the air. Reduced Graphene Oxide is electrically non-conductive. Care should be taken, therefore, to avoid accumulations of reduced graphene Oxide dust 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.

## 8. 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.

### Personal Protective Equipment

**Respiratory protection:** Protect against inhalation. A respiratory protection program that fulfills applicable OSHA requirements should be maintained.

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

**Skin protection:** Protect against skin contact by wearing protective gloves. Protect against skin contact by wearing 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)

Critical Temperature: 681°C (1257.8°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: Soluble in water, ethanol DMF et al.

## 10. Stability & Reactivity

**Stability:** The product is stable.  
Instability Temperature: Not available.  
Conditions of Instability: Incompatible materials, excess heat  
This substance is incompatible with oxidizing agents as it is highly reactive.  
Corrosivity: Non-corrosive in the presence of glass.

### Special Remarks on Reactivity:

Reacts vigorously with liquid potassium and potassium peroxide. If reduced graphene oxide contacts liquid potassium, rubidium, or cesium at 300°C, intercalation compounds may be formed.

Special Remarks on Corrosivity: Not available.  
Polymerization: Will not occur.

## 11. 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 and the cardiovascular system.

**Other Toxic Effects on Humans:** A bit hazardous in case of skin contact, inhalation, or ingestion.

**Special Comments on Toxicity to Animals:** Not available.

### Special Comments on Other Toxic Effects on Humans:

**Acute Potential Health Effects: Skin:**  
Causes 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 reduced 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 reduced graphene dust. The toxicology of this substance has yet to be thoroughly investigated.

### 12. Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

#### Products of Biodegradation:

Hazardous short-term degradation products are not likely. However, long-term degradation products may arise.

**Toxicity of the Products of Biodegradation:** "The product and its degraded forms are non-toxic."

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

### 13. Disposal Considerations

#### Waste Disposal:

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

### 14. Transport Information

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

**Identification:** Not applicable

**Special Provisions for Transport:** Not applicable.

## 15. Regulatory Information

Reduced graphene oxide (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

US: TCSA Canada: DSL EC: EINECS

This product has WHMIS (Canada) classification D2A

## 16. Other Information

**References:** Not available.

**Other Special Considerations:** Not available.