MATERIAL SAFETY DATA SHEET (MSDS)

Product Name: Graphene Industrial Grade
Product Series: Graph-Nanoplate-001

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
Plot No. - 463, Yadav Nagar
Nagpur, Maharashtra, India
Pin Code- 440026
Emergency Contact: +91(0) 8007799090
Emergency Contact Email: info@techinstro.com

2. Composition/Information on Ingredients

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

3. Hazards Identification

Potential acute health effects: Bit hazardous in 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: The substance is toxic to the upper respiratory tract and cardiovascular system. Repeated exposure to the substance can produce target organ damage.

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4. First Aid Measures

Eyes: Check and remove contact lenses, if any. 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 air. If the patient is not breathing, then artificial respiration is given. If breathing is difficult, then give oxygen.

Severe Inhalation: Not known

Ingestion:

Do NOT induce vomiting unless told to do so by the doctor. Never give anything by mouth to an unconscious person. If large quantities of this material are taken, call a physician immediately. Loosen, tight clothing like a collar, tie, belt or waistband.

Serious Ingestion: Not available.

5. 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 appropriate for surroundings.

Other Combustion Hazards: in the event of combustion or thermal decomposition, this may release carbon monoxide (CO), carbon dioxide (CO_2), 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.

6. 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.

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Personnel: Cleanup personnel should wear suitable protective equipment to prevent inhalation or skin contact. Cleanup personnel should be cautious of slipping 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 substance is stable under normal conditions and doesn't pose a significant risk of combustion. It should be stored in labeled, sealed containers away from heat or ignition sources. Care

This should be taken to avoid accumulating dust concentrations since any dust can form a potentially explosive mixture in the air. Graphene is electrically conductive. Care should be taken to prevent accumulations of Graphene dusts or powders in places where these accumulations could cause electrical switches, circuits, or components shortening.

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^3 respirable OSHA (PEL): 15 ml/m^3 respirable
Crystalline Silica (CAS no. 14808-60-7) TWA: ACGIH (TLV): 0.025 mg/m^3 respirable OSHA (PEL): 10 mg/m^3 respirable.

Personal Protective Equipment

Respiratory protection: Protect against inhalation. A respiratory protection program that fulfills applicable OHSA requirements should be maintained in the workplace.

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.

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Engineering Controls

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

9. Physical and Chemical Properties

1. Physical state and appearance: Solid
2. Odor: Odorless.
3. Taste: Tasteless.
4. Molecular Weight: 12.01 g/mol
5. Color: Black
6. pH (1% soln/water): Not applicable
7. Boiling Point: Not available.
8. Melting Point: 3650°C (6602°F)
9. Critical Temperature: 681°C (1257.8°F)
10. Specific Gravity: Not available
11. Vapor Pressure: Not applicable.
12. Vapor Density: Not available.
13. Volatility: Not available.
14. Odor Threshold: Not available.
15. Water/Oil Dist. Coeff.: Not available.
16. Ionicity (in water): Not available.
17. Dispersion Properties: Not available.
18. Solubility: Insoluble in cold water.

10. Stability & Reactivity

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials.

Incompatibility with various substances: Highly reactive with oxidizing agents.

Corrosivity: Non-corrosive in the presence of glass.

Special Remarks on Reactivity:

Reacts vigorously with liquid potassium and potassium peroxide. If Hydroxyl Functionalized Graphene contacts liquid potassium, rubidium, or cesium at 300oC, intercalation compounds may be formed.

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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. It may cause damage to the following organs: the cardiovascular system.

Other Toxic Effects on Humans: Bit hazardous in skin contact, ingestion, or inhalation.

12. Ecological Information
Ecotoxicity: Not known.

BOD5 and COD: Not available.

Products of Biodegradation:

Potentially hazardous short-term degradation products are unlikely. However, long-term degradation of products may occur.

Toxicity of the Products of Biodegradation: The self-product and its degradation products are not toxic.

Special Comments on the Products of Biodegradation: Not known.

13. Disposal Considerations

Waste Disposal:

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

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14. Transport Information

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

Special Provisions for Transport: Not applicable.

15. Regulatory Information

Graphene 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.

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