

## Material Safety Data Sheet

### 1. PRODUCT AND COMPANY INFORMATION

**Product name** : Graphene on Quartz glass  
**Company** : GRAPHENE SQUARE INC.  
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Seoul, 08826, Republic of Korea  
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**Website** : www.graphenesq.com

#### Recommended use of the chemical and restrictions on use

Recommended use : R&D Sample

Restrictions on use : Foodstuffs

### 2. HAZARDS IDENTIFICATION

#### Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

Physical hazard : Not applicable

Health hazard : Not applicable

Environment hazard : Not applicable

#### Label elements including precautionary statements

Symbol / Signal word : Not applicable

Hazard statements / Precautionary statements : Not applicable

#### NFPA Rating

Health : 0

Flammability : 0

Reactivity : 0

Water reactivity : 0

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	CAS No.	EINECS No.	Conc. %
Carbon	7440-44-0	231-153-3	0.00001 %
Quartz glass	60676-86-0	293-303-4	99.99999 %

## 4. FIRST AID MEASURES

### **In case of eye contact**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

### **In case of skin contact**

Wash off with soap and plenty of water.

### **If inhaled**

If breathed in, move person into fresh air.

If not breathing, give artificial respiration.

### **If swallowed**

Never give anything by mouth to an unconscious person.

### **Potential health effect**

May be harmful if swallowed.

### **Other medical attention.**

Medical personnel should be aware of the protective measures of the substance.

## 5. FIRE-FIGHTING MEASURES

### **Flammable properties**

Flash point : No flash occurred under 93 °C (Rapid equilibrium method)

Autoignition temperature : No spontaneous combustion under 200 °C

Burning rate : Did not ignite. at 20 °C (UN TDG test & criteria - Test N1)

### **Suitable extinguishing media**

Water spray, alcohol-resistant foam, dry chemical, carbon dioxide

### **Specific hazards arising from the chemical**

No data available

### **Special protective equipment for fire-fighters**

Wear self contained breathing apparatus for fire fighting if necessary.

## 6. ACCIDENTAL RELEASE MEASURES

### **Personal precautions**

Avoid breathing dust.

### **Environmental precautions**

No data available

### **Methods and materials for containment and cleaning up**

Pick up and arrange disposed materials without creating dust.

## 7. HANDLING AND STORAGE

### Precautions for safe handling

Avoid breathing dust.

Avoid contact with skin and eyes.

Wash hands thoroughly after handling.

### Conditions for safe storage

Keep in suitable, closed containers for disposal.

## 8. EXPOSURE CONTROL/PERSONAL PROTECTION

### Components with workplace control parameter

KOSHA :	Chemical Name	TWA	STEL
	Quartz glass	0.1 mg/m <sup>3</sup>	-
US ACGIH :	Chemical Name	TLV	STEL
	Quartz glass	0.1 mg/m <sup>3</sup> , respirable fraction	-

Appropriate engineering controls : Ventilation

### Personal protective equipment

Respiratory protection : Dust mask

Hand protection : Protective gloves

Eye protection : Protective goggles

Skin and body protection : Working clothes

## 9. PHYSICAL AND CHEMICAL PROPERTIES

State : Solid (Not powder) at 20 °C

Appearance form : Plate (Thickness : > 1.1 mm)

pH : 6.5 ~ 7.5 at 20 °C ※ Sample : H<sub>2</sub>O = 1 : 5 (V/V)

Flash point : No flash occurred under 93 °C (Rapid equilibrium method)

Autoignition temperature : No spontaneous combustion under 200 °C

Water solubility : Water Insoluble at 20 °C

Density : 2.3 at 20 °C

### Flammability

Burning rate : Did not ignite. at 20 °C ※ UN TDG test & criteria - Test N1

Explosive properties : No self-reaction hazard ※ UN TDG test & criteria - Test E3

**Melting range** : No data available

**Boiling point (Initial)** : No data available

**Vapour pressure** : No data available

**Decomposition temperature** : No data available

**Partition coefficient (*n-octanol/water*)** : No data available

**Viscosity** : No data available

**Lower explosion limit / Upper explosion limit** : No data available

## 10. STABILITY AND REACTIVITY

### Chemical stability

Stable under general condition.

### Conditions to avoid

Avoid dust formation.

### Materials to avoid

Strong oxidizing agents

### Hazardous decomposition products

Carbon oxides

## 11. TOXICOLOGICAL INFORMATION

### Acute toxicity

Oral	rat	LD50 : > 2,000 mg/kg	※ from US NLM / ECHA
Inhalation	rat	LC50 : No data available	
Skin	rabbit	LD50 : No data available	

**Skin irritation** : Not classifiable ※ from ECHA

**Eye irritation** : Not classifiable ※ from ECHA

**Respiratory sensitization** : No data available

**Skin sensitization** : No data available

**Germ cell mutagenicity** : No data available

**Carcinogenicity** : Not classifiable ※ from CCRIS / IARC

**Reproductive toxicity** : No data available

**Specific target organ toxicity – single exposure (GHS)** : No data available

**Specific target organ toxicity – repeated exposure (GHS)** : No data available

**Aspiration hazard** : No data available

## 12. ECOLOGICAL INFORMATION

### Toxicity

Fish	LC50	: No data available	※ from US NLM / ECHA
Crustacean	EC50	: No data available	
Algae	EC50	: No data available	

**Persistence and degradability** : No data available

**Bioaccumulative potential** : No data available

**Mobility in soil** : No data available

**Other adverse effects** : No data available

## 13. DISPOSAL CONSIDERATIONS

### Disposal consideration

Observe all environmental regulations.

### Disposal precaution

Keep in suitable, closed containers for disposal.

## 14. TRANSPORT INFORMATION

UN TDG : Not dangerous goods

IATA : Not dangerous goods

IMDG : Not dangerous goods

**Marine pollution** : Not applicable

### Special precaution

Fire EmS Guide : F-A (Recommendation)

Spillage EmS Guide : Not dangerous goods

## 15. REGULATORY INFORMATION

**Korea Industrial Safety and Health Act (GHS)** : Not applicable

**Korea Hazardous Materials Safety Control Act** : Not hazardous material

**Korea Chemicals Control Act** : Not toxic chemical

**Korea Persistent Organic Pollutants Control Act** : Not applicable

**US OSHA Hazards (GHS)** : Not applicable

## 16. OTHER INFORMATION

**Issued Date** : 2015. 10. 06.

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**Revision Date** : -

**References**

- GHS Classification :  
Korea MSDS Testing Lab Certificate (Report No. 2015-03-002027), US NLM
- Physical and chemical properties : Korea MSDS Testing Lab Certificate
- Transport information : Korea MSDS Testing Lab Certificate
- Toxic & ecological information : OECD SIDS, ECHA, US NLM, HSDB, IARC, CCRIS, JP NITE

**Acronyms and Websites**

- ECHA : European chemical agency, <http://echa.europa.eu/>
- US NLM : U.S. National Library of Medicine, <http://chem.sis.nlm.nih.gov/chemidplus/>
- HSDB : US Hazardous Substances Data Bank, <http://toxnet.nlm.nih.gov/>
- CCRIS : US Chemical Carcinogenesis Research Information System, <http://toxnet.nlm.nih.gov/>
- IARC : International Agency for Research on Cancer, <http://monographs.iarc.fr/>
- JP NITE : Japan National Institute of Technology and Evaluation, <http://www.safe.nite.go.jp/>

**※ Hazards Testing and Classification**

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The product composition is provided by the mentioned company of this MSDS' section 1.  
This MSDS is composed in line with The Korea Occupational Safety and Health Act Article 41 to protect the health of the employees, and for documentation.  
This MSDS is composed with reference to documents and criteria provided by KOSHA.

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