# Material Safety Data Sheet

| 하이솔이엠(주) HYSOL EM Co., Ltd. | LMC-565U-G | | |
|---|---|---|---|
| | Date of issue | 2022-12-16 | Rev No |
| | Revision date | | 01 |

## 1. IDENTIFICATION

### A. Product name

LMC-565U-G

### B. Recommended use and restriction on use

- General use : Encapsulation material for semiconductor
- Restriction on use : Not available

### C. Manufacturer / Supplier information

- Company name : HYSOL EM Co.,Ltd
- Address : 99, Seokam-ro, Iksan-si, Jeollabuk-do, Korea
- Telephone number : 82 63 900 7200
- Fax number : 82 63 833 2199

## 2. HAZARD IDENTIFICATION

### A. GHS Classification

- Acute Toxicity (Inhalation: dust / mist) : Category4
- Skin sensitization : Category1
- Germ cell mutagenicity : Category2

### B. GHS label elements

○ **Hazard symbols**

○ **Signal words**

- Warning

○ **Hazard statements**

- H317 May cause an allergic skin reaction
- H332 Harmful if inhaled
- H341 Suspected of causing genetic defects

○ **Precautionary statements**

**1) Prevention**

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
- P271 Use only outdoors or in a well-ventilated area.
- P272 Contaminated work clothing should not be allowed out of the workplace.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

**2) Response**

- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P308+P313 If exposed or concerned: Get medical advice/attention.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P321 Specific treatment
- P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
- P362+P364 Take off contaminated clothing and wash before reuse.

**3) Storage**

- P405 Store locked up.

**4) Disposal**

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

### C. Other hazards which do not result in classification

- Not available

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical Name | Trade names and Synonyms | CAS No. | Content(%) |
|---|---|---|---|
| Silica, vitreous | Silicon dioxide (vitreous) ; Fused silica ; Silica, amorphous, fused ; | 60676-86-0 | 65~85 |
| Formaldehyde polymer with (chloromethyl)oxirane and 2-methylphenol | Not available | 29690-82-2 | 8~18 |
| Boehmite (Al(OH)O) | Boehmite (Al(OH)O) | 1318-23-6 | 3~9 |
| Phenol polymer with hydroxybenzaldehyde | Not available | 106466-55-1 | 2~8 |
| Phenol polymer with formaldehyde | Not available | 9003-35-4 | 2~8 |
| Carbon black | Inorganic,carbon black ; Acetylene Black ; Channel black | 1333-86-4 | 0.1~1 |

## 4. FIRST AID MEASURES

### A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.

### B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- Wash thoroughly after handling.

### C. Inhalation contact

- Take specific treatment if needed.
- When exposed to large amounts of steam and mist, move to fresh air.
- Get medical attention immediately.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.

### D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.
- Get medical attention immediately.

### E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

### F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- If exposed or concerned, get medical attention/advice.

## 5. FIREFIGHTING MEASURES

### A. Suitable (Unsuitable) extinguishing media

- Avoid use of water jet for extinguishing
- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray

### B. Specific hazards arising from the chemical

- Harmful if inhaled
- May cause an allergic skin reaction
- Suspected of causing genetic defects

### C. Special protective actions for firefighters

- Avoid inhalation of materials or combustion by-products.
- Cool containers with water until well after fire is out.
- Do not approach the tank surrounded by fire until it is extinguished.
- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.
- Keep unauthorized personnel out.

## 6. ACCIDENTAL RELEASE MEASURES

### A. Personal precautions, protective equipment and emergency procedures

- Do not touch spilled material. Stop leak if you can do it without risk.
- Handle the damaged containers or spilled material after wearing appropriate protective equipment
- Move container to safe area from the leak area.
- Must work against the wind, let the upwind people to evacuate.
- Remove all sources of ignition.

### B. Environmental precautions

- If large amounts have been spilled, inform the relevant authorities.
- Prevent runoff and contact with waterways, drains or sewers.

### C. Methods and materials for containment and cleaning up

- Appropriate container for disposal of spilled material collected.
- Disposal of waste shall be in compliance with the Wastes Control Act
- Dust spills : Cover dust spills with plastic sheet or waterproof cloth to minimize spreading and avoid contact with water.
- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.

## 7. HANDLING AND STORAGE

### A. Precautions for safe handling

- Avoid contact with incompatible materials.
- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.
- Do not handle until all safety precautions have been read and understood.

### B. Conditions for safe storage, including any incompatibilities

- Avoid direct sunlight.
- Check regularly for leaks.
- Do not apply any physical shock to container.
- Do not apply direct heat.
- Do not use damaged containers.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### A. Exposure limits

○ **ACGIH TLV**

- [Carbon black] : TWA, 3 mg/m3, Inhalable particulate matter

○ **OSHA PEL**

- [Silica, vitreous] : 80 mg/m3 (%SiO2)
- [Carbon black] : 3.5

### B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

### C. Individual protection measures, such as personal protective equipment

○ **Respiratory protection**

- Air-purifying respirator with high-efficiency particulate filtering
- Any respiratory protection with a electromotion fan(for dust, mist, fume-purifying)
- Consider warning properties before use.
- Dust, mist, fume-purifying respiratory protection
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- Respiratory protection is ranked in order from minimum to maximum.
- Self-contained breathing apparatus with a corpuscle filter of high efficiency
- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.

○ **Eye protection**

- Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.

○ **Hand protection**

- Wear appropriate chemical resistant glove.

○ **Skin protection**

- Wear appropriate chemical resistant protective clothing.

○ **Others**

- Not available

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| A. Appearance | |
| - Appearance | Tablet |
| - Color | black |
| B. Odor | inodorousness |
| C. Odor threshold | inodorousness |
| D. pH | 5.0~7.5 (extrated water) |
| E. Melting point/Freezing point | Not available |
| F. Initial Boiling Point/Boiling Ranges | Not available |
| G. Flash point | Not available |
| H. Evaporation rate | Not available |
| I. Flammability(solid, gas) | Not available |
| J. Upper/Lower Flammability or explosive limits | Not available |
| K. Vapour pressure | Not available |
| L. Solubility | Not available |
| M. Vapour density | Not available |
| N. Specific gravity(Relative density) | 1.7~2.0 |
| O. Partition coefficient of n-octanol/water | Not available |
| P. Autoignition temperature | Not available |
| Q. Decomposition temperature | Not available |
| R. Viscosity | Not available |
| S. Molecular weight | Not available |

## 10. STABILITY AND REACTIVITY

### A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

### B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

### C. Conditions to avoid

- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with incompatible materials and condition.

### D. Incompatible materials

- Not available

### E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

## 11. TOXICOLOGICAL INFORMATION

### A. Information on the likely routes of exposure

○ **Respiratory tracts**

- Not available

○ **Oral**

- Not available

○ **Eye·Skin**

- May cause an allergic skin reaction

### B. Delayed and immediate effects and also chronic effects from short and long term exposure

○ **Acute toxicity**

*** Oral**

- Product (ATEmix) : 2000mg/kg < ATEmix <= 5000mg/kg
- [Silica, vitreous] : LD50 = 3160 ㎎/㎏ Rat (KOSHA)
- [Formaldehyde polymer with (chloromethyl)oxirane and 2-methylphenol] : LD50 > 10000 ㎎/㎏ Rat (Ciba - Geigy)
- [Boehmite (Al(OH)O)] : LD50 >2000 ㎎/㎏ Rat (OECD Guideline 423, GLP, Read-across CAS no.21645-51-2)(ECHA)
- [Phenol polymer with formaldehyde] : LD50 > 5000 ㎎/㎏ Rat (TOMES;RTECS)
- [Carbon black] : LD50 = 15400 ㎎/㎏ Rat (NITE(2006)), LD50 >8000 ㎎/㎏ Rat(ECHA)

*** Dermal**

- Product (ATEmix) : 2000mg/kg < ATEmix <= 5000mg/kg
- [Formaldehyde polymer with (chloromethyl)oxirane and 2-methylphenol] : LD50 > 3000 ㎎/㎏ Rabbit (Ciba - Geigy)
- [Boehmite (Al(OH)O)] : LD50 = 4000 ㎎/㎏
- [Phenol polymer with formaldehyde] : LD50 > 2000 ㎎/㎏ Rat (TOMES;RTECS)
- [Carbon black] : LD50 > 3000 ㎎/㎏ rabbit (NITE), LD50 >8000 ㎎/㎏ Rabbit(ECHA)

*** Inhalation**

- Product (ATEmix) : 1.0mg/L < ATEmix <= 5.0mg/L
- [Boehmite (Al(OH)O)] : dust LC50 >2.3 ㎎/ℓ 4 hr Rat (OECD Guideline 403, GLP, Read-across)(ECHA)
- [Carbon black] : DUST LC50 > 4.6 ㎎/㎥ 4 hr Rat, No death (ECHA)

○ **Skin corrosion/irritation**

- Not available

○ **Serious eye damage/irritation**

- Not available

○ **Respiratory sensitization**

- Not available

○ **Skin sensitization**

- May cause an allergic skin reaction

○ **Carcinogenicity**

*** IARC**

- [Silica, vitreous] : Group 3 (Silica, amorphous)
- [Carbon black] : Group 2B

*** OSHA**

- Not available

*** ACGIH**

- [Boehmite (Al(OH)O)] : A4 (Aluminum insoluble compounds)
- [Carbon black] : A3

*** NTP**

- Not available

*** EU CLP**

- Not available

○ **Germ cell mutagenicity**

- Suspected of causing genetic defects

○ **Reproductive toxicity**

- Not available

○ **STOT-single exposure**

- Not available

○ **STOT-repeated exposure**

- Not available

○ **Aspiration hazard**

- Not available

## 12. ECOLOGICAL INFORMATION

### A. Ecotoxicity

○ **Fish**

- [Boehmite (Al(OH)O)] : LC50 100 ㎎/ℓ 96 hr Oncorhynchus mykiss (IUCLID), LC50 1.16 ㎎/ℓ 96 hr Pimephales promelas(US EPA 1985, GLP, Read-across CAS No.7784-13-6) (ECHA)
- [Phenol polymer with formaldehyde] : LC50 185mg/L 48h Oncorhynchus mykiss (ECHA)
- [Carbon black] : LC50 >1000 ㎎/ℓ 96 hr Other(Tribolodon hakonensis)(NITE)

○ **Crustaceans**

- [Boehmite (Al(OH)O)] : EC50 >100 ㎎/ℓ 48 hr Daphnia magna (IUCLID, ECHA)
- [Phenol polymer with formaldehyde] : EC50 172mg/L 48h Daphnia pulex (ECHA)
- [Carbon black] : EC50 > 5600 ㎎/ℓ 24 hr Daphnia magna(OECD Guideline 202, GLP) (NITE)

○ **Algae**

- [Boehmite (Al(OH)O)] : ErC50 >100 ㎎/ℓ 72 hr (Desmodesmus subspicatu (OECD Guideline 201, GLP))(ECHA)
- [Phenol polymer with formaldehyde] : EC50 575mg/L 24h Desmodesmus subspicatus (ECHA)
- [Carbon black] : ErC50 >10000 ㎎/ℓ 72 hr Desmodesmus subspicatus (OECD Guideline 201, GLP)(EHCA)

### B. Persistence and degradability

○ **Persistence**

- [Formaldehyde polymer with (chloromethyl)oxirane and 2-methylphenol] : (Not applicable)
- [Phenol polymer with formaldehyde] : Log Kow 3.56 (ECHA)

○ **Degradability**

- Not available

### C. Bioaccumulative potential

○ **Bioaccumulative potential**

- [Boehmite (Al(OH)O)] : BCF = 50 ~ 231(ECHA)

○ **Biodegradation**

- [Phenol polymer with formaldehyde] : readily biodegradable (ECHA)

### D. Mobility in soil

- Not available

### E. Other adverse effects

- [Boehmite (Al(OH)O)] : Fish(Salvelinus fontinalis); NOEC(30d) 0.057mg/L, ((Cleveland, L., E.E. Little, S.J. Hamilton, D.R. Buckler, and J.B. Hunn. 1986), Read-across: CAS no.10043-01-3), Crustaceans(Daphnia magna); NOEC(21d) 0.076mg/L, (OECD Guideline 211, GLP, Read-across: CAS no. 7429-90-5), Algae(Pseudokirchnerella subcapitata); NOEC(72h) ≥ 0.004mg/L, (OECD Guideline 201, GLP, Read-across: CAS no. 21645-51-2) (ECHA)
- [Carbon black] : Algae: Desmodesmus subspicatus NOEC > 10000 mg/L 72hr, (OECD Guideline 201, GLP) (ECHA)

## 13. DISPOSAL CONSIDERATIONS

### A. Disposal methods

- It shall be treated by incineration
- Oil water separation technology shall be applied as pre-waste treatment if it is applicable

- Stabilization and minimization treatment by incineration or similar method can be applied, if more than two kinds of designated wastes are in mixture state and it is impractical to separate them

### B. Special precautions for disposal

- Anyone with business license number who generates industrial wastes shall treat the waste by him/herself or by entrusting to the legal entities who treat the wastes, recycle the wastes of others or install and operate the waste treatment facilities according to the Wastes Control Act

- Dispose of waste in accordance with all applicable laws and regulations.

## 14. TRANSPORT INFORMATION

### A. UN No. (IMDG CODE/IATA DGR)

- Not applicable

### B. Proper shipping name

- Not applicable

### C. Hazard Class

- Not applicable

### D. IMDG CODE/IATA DGR Packing group

- Not applicable

### E. Marine pollutant

- Not applicable

### F. Special precautions for user related to transport or transportation measures

- Air transport(IATA): Not subject to IATA regulations.
- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : Not available
- EmS SPILLAGE SCHEDULE : Not available

## 15. REGULATORY INFORMATION

### A. National and/or international regulatory information

○ **POPs Management Law**

- [Silica, vitreous] : Not applicable
- [Formaldehyde polymer with (chloromethyl)oxirane and 2-methylphenol] : Not applicable
- [Boehmite (Al(OH)O)] : Not applicable
- [Phenol polymer with hydroxybenzaldehyde] : Not applicable
- [Phenol polymer with formaldehyde] : Not applicable
- [Carbon black] : Not applicable

○ **Information of EU Classification**

*** Classification**

- Not applicable

○ **U.S. Federal regulations**

*** OSHA PROCESS SAFETY (29CFR1910.119)**

- Not applicable

*** CERCLA Section 103 (40CFR302.4)**

- Not applicable

*** EPCRA Section 302 (40CFR355.30)**

- Not applicable

*** EPCRA Section 304 (40CFR355.40)**

- Not applicable

*** EPCRA Section 313 (40CFR372.65)**

- Not applicable

○ **Rotterdam Convention listed ingredients**

- Not applicable

○ **Stockholm Convention listed ingredients**

- Not applicable

○ **Montreal Protocol listed ingredients**

- Not applicable

## 16. OTHER INFORMATION

### A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.

- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS