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SECTION 1. Chemical product and company identification
Product name: Quantum Dots Photo-Resist
Supplier: Taiwan Nanocrystals Inc.
Address: No.4, Aly. 3, Ln. 52, Sec. 1, Dongmen Rd., East Dist., Tainan City 701, Taiwan (R.O.C.)
Tel: +886-6-208-5209
E-mail address: twnc@twncqds.com

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Flammable liquid (Category 3), H226
Carcinogenicity (Category 1), H350
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

2.2 Label elements
GHS-Pictogram:

Signal word: Danger
Hazard statement(s):

H302 + H332    Harmful if swallowed or if inhaled
H315    Causes skin irritation
H318    Causes serious eye damage
H350    May cause cancer
H373    May cause damage to organs through prolonged or repeated exposure
H410    Very toxic to aquatic life with long lasting effects

Precautionary statement(s):
P201    Obtain special instructions before use
P261    Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray
P273    Avoid release to the environment
P280    Wear eye protection/ face protection
P305 + P351 + P338 + IF IN EYES: Rinse cautiously with water for several minutes. Remove contact
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P310 lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
P308 + P313 IF exposed or concerned: Get medical advice/attention

2.3 Other hazards
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octadecylamine</td>
<td>124-30-1</td>
<td>0.3% - 3.0%</td>
</tr>
<tr>
<td>Cadmium selenide</td>
<td>1306-24-7</td>
<td>0.3% - 1.8%</td>
</tr>
<tr>
<td>Zinc sulfide</td>
<td>1314-98-3</td>
<td>0.45% - 4.2%</td>
</tr>
<tr>
<td>Propylene glycol monomethyl ether acetate (PGMEA)</td>
<td>108-65-6</td>
<td>60.0% - 70.0%</td>
</tr>
<tr>
<td>Photo initiator</td>
<td>119313-12-1</td>
<td>1 - 2%</td>
</tr>
<tr>
<td>Acrylic Monomer</td>
<td>478556-66-0</td>
<td></td>
</tr>
<tr>
<td>Acrylic Resin</td>
<td>80-62-6</td>
<td>8 - 10%</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>0.5 - 1.0%</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

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

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2)

4.3 Indication of any immediate medical attention and special treatment needed
No data available
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SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx), Sulphur oxides, Cadmium/cadmium oxides, Zinc/zinc oxides,
Selenium/selenium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further Information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas. Avoid breathing dust.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment
must be avoided. Avoid heat, flame and ignition source.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable,
closed containers for disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid ignition sources. Avoid exposure -
obtain special instructions before use. Provide appropriate exhaust ventilation at places where dust is formed. For
precautions see section 2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Prohibition of smoking and
ignition sources. Never allow product to get in contact with water during storage. Do not store near acids. Do not
freeze.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials
causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.
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SECTION 8: Exposure controls/personal protection

8.1 Control parameters
Components with workplace control parameters

8.2 Exposure controls
Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment
Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>a) Appearance</th>
<th>Green Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Odour</td>
<td>No data available</td>
</tr>
<tr>
<td>c) Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>d) pH</td>
<td>No data available</td>
</tr>
<tr>
<td>e) Melting point/freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>f) Initial boiling point and boiling range</td>
<td>146°C (PGMEA)</td>
</tr>
<tr>
<td>g) Flash point</td>
<td>42°C (PGMEA) (Setaflash Closed Cup)</td>
</tr>
</tbody>
</table>
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h) Evaporation rate
0.39 (PGMEA)
i) Flammability (solid, gas)
No data available
j) Upper/lower flammability or explosive limits
1.5%-7.0% (PGMEA)
k) Vapour pressure
3.8 mm Hg @ 25°C (PGMEA)
i) Vapour density
4.6 (Air=1)
m) Relative density
No data available
n) Water solubility
No data available
o) Partition coefficient: noctanol/ water
No data available
p) Auto-ignition temperature
No data available
q) Decomposition temperature
No data available
r) Viscosity
No data available
s) Explosive properties
No data available
t) Oxidizing properties
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Acids, Oxidizing agents, Acid chlorides, Acid anhydrides

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation

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No data available
Germ cell mutagenicity
No data available
Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
Reproductive toxicity
No data available
Specific target organ toxicity - single exposure
No data available
Specific target organ toxicity - repeated exposure
No data available
Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Product
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.
Contaminated packaging
Dispose of as unused product.
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SECTION 14: Transport information

| 14.1 UN number: 3082
| 14.2 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
| 14.3 Transport hazard class(es): 9
| 14.4 Packaging group: III
| 14.5 Environmental hazards: yes

SECTION 15: Regulatory information

| 15.1 Applicable regulations:
Recommended guidelines, rules and standards for chemical safety handling, storage, transportation, loading / unloading hazard, classification and labeling, need to refer the regulations below:
Rules of Label and Hazard Communication for Dangerous and Harmful Materials
Airborne Permissible Exposure Concentration of Harmful Materials at the Labor Work Environment
Labor Safety and Health Law
Labor Safety and Health Law Enforcement Rules
Rules for Road Traffic Safety
Fire Services Act

SECTION 16: Other information

| 16.1 References:
The SDS of SIGMA-ALDRICH
The database of SDS of Council of Labor Affairs, Executive Yuan, Taiwan

| 16.2 Prepared by:
Chih-Jung Chen Manager
Taiwan Nanocrystals Inc.
No.4, Aly. 3, Ln. 52, Sec. 1, Dongmen Rd., East Dist., Tainan City 701, Taiwan (R.O.C.)
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