MATERIAL SAFETY DATA SHEET

CdSe Core Quantum Dots 550/ 570/ 585 nm
CdSe/ZnS Core/Shell Quantum Dots 595/ 610/ 620 nm
According to EC Nº 453/2010
Edition date 09/01/2017
Version 2.0

Section 1.- Identification of the substance/mixture and of the company

- **Identification of the product:** CdSe/ Core Quantum Dots 550/ 570/ 585 nm
  CdSe/ZnS Core/ Shell Quantum Dots 595/ 610/ 620 nm
- **Chemical family:** Quantum Dots solution
- **Product name:** DRP-QDCORE-550
  DRP-QDCORE-570
  DRP-QDCORE-585
  DRP-QDCORESHELL-595
  DRP-QDCORESHELL-610
  DRP-QDCORESHELL-620
- **Use of the substance/preparation:** Research use only
- **Manufacturer/supplier identification:**
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Section 2.- Hazards identification

Classification of the mixture:

According to Regulation CLP (EC) No1272/2008
Acute toxicity, Oral (Category 4) H302
Acute toxicity, Inhalation (Category 3) H331
Skin irritation (Category 2) H315
Eye irritation (Category 2) H319
Carcinogenicity (Category 2) H351
Reproductive toxicity (Category 2) H361d
Specific target organ toxicity – single exposure (Category 3) Central nervous system H336
Specific target organ toxicity – repeated exposure (Category 1) H372

Label elements:

Hazard statements
- H302: Harmful if swallowed
- H315: Causes skin irritation
- H319: Causes serious eye irritation
- H331: Toxic if inhaled
- H336: May cause drowsiness or dizziness
- H351: Suspected of causing cancer
- H361d: Suspected of damaging fertility or the unborn child
- H372: Causes damage to organs through prolonged or repeated exposure

Precautionary statements
- P261: Avoid breathing dust/ fume/ gas/ mist/ vapour/ spray
- P281: Use personal protective equipment as required

P305 + P338 + P351– If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311: Call a POISON CENTER or doctor/ physician

Section 3.- Composition/Information on ingredients

CdSe Core Quantum Dots 550 nm	**CAS**: none **Concentration**: 21 ± 2µM
CdSe Core Quantum Dots 570 nm	**CAS**: none **Concentration**: 23 ± 2µM
CdSe Core Quantum Dots 585 nm	**CAS**: none **Concentration**: 24 ± 2µM
CdSe/ZnS Core/ Shell Quantum Dots 595 nm	**CAS**: none **Concentration**: 24 ± 2µM
CdSe/ZnS Core/ Shell Quantum Dots 610 nm	**CAS**: none **Concentration**: 19 ± 3µM
CdSe/ZnS Core/ Shell Quantum Dots 620 nm	**CAS**: none **Concentration**: 20 ± 2µM
Chloroform	**Synonyms**: Trichloromethane, Methylidyne trichloride **Formula**: $CHCl_3$ **Molecular weight**: 119.38 g/mol **CAS**: 67-66-3 **Classification:** Accute tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2; Carc. 2; Repr. 2

Section 4.- First aid measures

- **General advice:** Consult a physician. Show this safety data sheet to the doctor in attendance.
- **After skin contact:** Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.
- **After ingestion**: Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.
- **After eye contact:** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
- **After inhalation:** If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
  The most important known symptoms and effects are described in the labelling and/ or in section 11.

Section 5.- Fire-fighting measures

- **Suitable extinguishing media:** use water spray, alcohol resistant foam, dry chemical or carbon dioxide.
- **Special hazards arising from the substance**: carbon oxides, Hydrogen chloride gas.
- **Special protective equipment for fire fighting:** Wear self contained breathing apparatus for fire fighting if necessary.
- **Further information:** Use water spray to cool unopened containers.

Section 6.- Accidental release measures

- **Person-related precautionary measures:** Use personal protective equipment. Avoid breathing vapours. Ensure adequate ventilation. Evacuate personnel to safe areas.
- **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.
- **Methods and materials for containment and cleaning up:** Contain spillage and then with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.
- **Procedures for cleaning/absorption:** Keep in suitable, closed containers for disposal.

Section 7.- Handling and storage

- **Handling**: Use personal protective equipment as required. Wear personal protective equipment. Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
- **Storage:** Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage classification: Non-combustible, acute toxicity Cat. 3/ toxic hazardous materials or hazardous materials causing chronic effects.

Section 8.- Exposure controls/personal protection

At this time, the limited evidence available suggests caution when potential exposures to nanoparticles may occur. Due to the limited information about health risks from nanomaterials, it is prudent to take steps for minimizing worker exposures. Research is still needed to understand the impact of nanotechnology on health, and to determine appropriate exposure monitoring and control strategies.

Exposure controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

– Hand protection	Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique to avoid skin contact with this product.
– Eye protection	Safety glasses with side-shields conforming to NIOSH (US) or EN166 (EU)
– Skin and body protection	Choose body protection according to the amount and concentration of the dangerous substance at the work place. Handle with gloves. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and standard EN 374 derived from it.
– Hygiene measures	Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Section 9.- Physical and chemical properties

- **General information:** – Form: liquid

- **Important health, safety and environmental information:**
  - pH value: No data available
  - Odour: no data available
  - Melting point/ freezing point: Melting point/ range: -63ºC
  - Initial boiling point and boiling range: 60.5 – 61.5 ºC
  - Flash point: no data available
  - Vapour pressure: 213.3 hPa at 20ºC
  - Vapour density: no data available
  - Relative density: 1.492 g/mL at 25ºC
  - Density: not determined
  - Solubility in water (20ºC): No data available

Section 10.- Stability and reactivity

- **Reactivity:** No data available
- **Chemical Stability:** Stable under recommended storage conditions.
- **Possibility of hazardous reactions:** No data available.
- **Incompatible materials:** No data available.
- **Conditions to avoid:** No data available.
- **Hazardous decomposition products:** Other decomposition products – no data available.
- **Further information:** Stable under recommended storage conditions.

Section 11.- Toxicological information

At this time, the limited evidence available suggest caution when potential exposures to nanoparticles may occur.

Due to the limited information about health risks from nanomaterials, it is prudent to take steps for minimize exposures. Studies have indicated that low solubility nanoparticles are more toxic than larger particles on a mass for mass basis. There are strong indications that particles surface area and surface chemistry are responsible for observed responses in cell cultures and animals. There are indications that nanoparticles can penetrate through the skin or move from the respiratory system to other organs.

Acute toxicity: No data available.
LD50 Oral - Rat - 908 mg/kg
Remarks: Behavioral:Change in motor activity (specific assay). Behavioral:Ataxia. Lungs, Thorax, or Respiration: Respiratory stimulation.
LOEC Inhalation - Rat - male - 6 h - 500 ppm
LD50 Dermal - Rabbit - > 20.000 mg/kg

Skin corrosion/irritation:
Skin – Rabbit
Result: Irritating to skin. - 24 h

Serious eye damage/eye irritation:
Eyes – Rabbit
Result: Irritating to eyes. - 24 h

Respiratory or skin sensitisation: Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity: Laboratory experiments have shown mutagenic effects.

Carcinogenicity:
Carcinogenicity - Rat – Oral
Tumorigenic:Carcinogenic by RTECS criteria. Leukaemia
The National Cancer Institute (NCI) has found clear evidence for carcinogenicity. Limited evidence of a carcinogenic effect.
IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform)

Reproductive toxicity: Suspected of damaging the unborn child. Suspected human reproductive toxicant

Specific target organ toxicity - single exposure: May cause drowsiness or dizziness.
Specific target organ toxicity - repeated exposure: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1. - Liver, Kidney

Aspiration hazard: No data available.

Additional Information:
RTECS: FS9100000
Vomiting, Gastrointestinal disturbance, Exposure to and/or consumption of alcohol may increase toxic effects., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Section 12.- Ecological information:

Toxicity
Toxicity to fish LC50 - Leuciscus idus (Golden orfe) - 162 mg/l - 48 h
LC100 - Leuciscus idus (Golden orfe) - 220 mg/l - 48 h
LC50 - other fish - 97 mg/l - 96 h
LC50 - Danio rerio (zebra fish) - 121 mg/l - 96 h
NOEC - Oryzias latipes - 122 mg/l - 10 d
NOEC - Oncorhynchus mykiss (rainbow trout) - 24 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates:
EC50 - Daphnia magna (Water flea) - 79,00 mg/l - 24 h
Immobilization EC50 - Daphnia magna (Water flea) - 51,6 mg/l - 48 h

NOEC - Daphnia magna (Water flea) - 120 mg/l - 11 d
Toxicity to algae
EC50 - No information available. - 500,00 mg/l - 24 h

Persistence and degradability No data available
Bioaccumulative potential
Bioaccumulation: Lepomis macrochirus (Bluegill) - 14 d - 0,11 mg/l
Bioconcentration factor (BCF): 6

Mobility in soil: No data available

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.

Other adverse effects: Harmful to aquatic life

Section 13.- Disposal considerations

- **Product:** Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose this material.
- **Contaminated packaging:** Dispose of as unused product.

Section 14.- Transport information

- **Road transport ADR/RID:**
  UN number: 1888
  UN proper shipping name: CHLOROFORM
  Transport hazard class: 6.1. Packaging group: III
  Environmental hazards: No

- **Sea transport IMDG:**
  UN number: 1888
  UN proper shipping name: CHLOROFORM
  Transport hazard class: 6.1. Packaging group: III
  Environmental hazards: Marine pollutant: no

- **Air transport IATA:**
  UN number: 1888
  UN proper shipping name: Chloroform
  Transport hazard class: 6.1. Packaging group: III
  Environmental hazards: no

Section 15.- Regulatory information

This safety datasheet has been revised to comply with the requirements establish in (EC) 453/2010.

Section 16.- Other information

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The contents and format of this MSDS are in accordance with EC 453/2010.

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