



SAFETY DATA SHEET

In accordance with the criteria of Regulation No 1907/2006 (REACH) as amended

Zinc Oxide Quantum Dots (ZnO QDs) coated with myristate ligands

Date: 16.09.2019

Revision: -

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Zinc Oxide Quantum Dots (ZnO QDs) coated with myristate ligands

Product number: ZnO-MA-S

Chemical name: Zinc oxide [CAS: 1314-13-2, EC: 215-222-5]

The registration number: Not applicable. The substance does not exceed imports / production above 1 tonne per year (Article 6 (1) of Regulation 1907/2006 (REACH)).

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Fluorescent material. Used for scientific research and development.

Uses advised against: Not specified.

1.3. Details of the supplier of the safety data sheet

Supplier: NANOXO sp. z o.o.

Address: Poland; PL 01-224 Warszawa; Marcina Kasprzaka 44/52 Street

Telephone: +48 22 378 48 30

E-mail address of the person responsible for the SDS: info@nanoxo.eu

1.4. Emergency telephone number

112 (emergency call)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation 1272/2008/EC:

Aquatic Acute 1; H400

Aquatic Chronic 1; H410

Hazards to man: Does not meet the criteria of classification.

Hazards to environment: Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Hazard from physical and chemical properties: Does not meet the criteria of classification.

In section 16 stated the importance of H-phrases and symbols.

During the classification of the substance (nanomaterial), a classification according to the CLP Regulation was used, but the actual environmental hazards are negligible due to the construction of the compound. This is indicated by literature data on similar nanomaterials (containing zinc oxide in their structure) and tests carried out by Nanoxo sp. z o.o. However, to maintain compliance with the CLP Regulation, the classification for environmental hazards has been maintained. Changing the classification in the safety data sheet in accordance with regulations requires further detailed testing.

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2.2. Label elements
Label accordance with Regulation 1272/2008/EC (CLP)
Hazard pictogram, signal words:

Warning
Hazard statements:

H410 - Very toxic to aquatic life with long lasting effects.

Precautionary statements:

P273 - Avoid release to the environment.

P391 - Collect spillage.

P501 - Dispose of contents/container to disposal containers.

The names of hazardous ingredients on the label: Zinc oxide [EC: 215-222-5]

2.3. Other hazards

The product does not meet the criteria for PBT or vPvB in accordance with Annex XIII of Regulation 1907/2006 (REACH).

SECTION 3: Composition/information on ingredients
3.1. Substances
Nanomaterial:

Substance name:	Zinc oxide
Concentration [%]:	45-60
CAS Number:	1314-13-2
EC Number:	215-222-5
Index Number:	030-013-00-7
Classification 1272/2008/EC:	Aquatic Acute 1; H400 Aquatic Chronic 1; H410

Substance name:	Tetrahydrofuran
Concentration [%]:	<1
CAS Number:	109-99-9
EC Number:	203-726-8
Index Number:	603-025-00-0
Classification 1272/2008/EC:	Flam. Liq. 2; H225 Carc. 2; H351 Eye Irrit. 2; H319 STOT SE 3; H335 EUH019



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Specific Concentration limits (CLP):
STOT SE 3; H335: C ≥ 25 %
Eye Irrit. 2; H319: C ≥ 25 %

In section 16 stated the importance of H-phrases and symbols.

The product does not contain impurities or additives that could affect product's labelling and classification according to Regulation No 1272/2008/EC (CLP) in the concentration ranges specified.

3.2. Mixtures

Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation: Move affected person to fresh air and keep at rest. In case of alarming symptoms, seek medical advice.

Skin contact: Remove all contaminated clothing. Wash contaminated skin with water. In case of alarming symptoms, seek medical advice.

Eye contact: Remove any contact lenses. Flush eyes with a plenty of water, occasionally lifting the upper and lower eyelids. Continue to rinse for at least 15 minutes. In case of alarming symptoms, seek medical advice.

Ingestion: Seek medical advice.

4.2. Most important symptoms and effects, both acute and delayed

Usually does not cause adverse health effects.

4.3. Indication of any immediate medical attention and special treatment needed

Remove affected person from the environment contaminated by the product. In the event of health problems, consult your doctor or the center of toxicological concern. Provide the information contained in the SDS. If unconscious, do not give anything by mouth.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: Extinguishing media should be adapted to surrounding objects.

Unsuitable extinguishing media: Not specified.

5.2. Special hazards arising from the substance or mixture

In case of fire hazardous products may be formed:: carbon oxide. Avoid inhalation of combustion products, because they may pose a health risk.

5.3. Advice for firefighters

Wear full protective equipment and self-contained breathing apparatus with independent air circulation. Containers exposed to fire or high temperature cool with water and if possible remove from the danger zone. Protect drains, surface waters and soil from pollution. Water from fire treated as hazardous pollution and accumulate in separate containers.



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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: Access of non-emergency personnel to the area of accident should be restricted until the completion of the disposal of the product. Wear appropriate personal protective equipment.

For emergency responders: Wear appropriate personal protective equipment.

6.2. Environmental precautions

Secure the gullies. Prevent contamination of surface water and ground. In the event of any serious pollution of the environment, notify the appropriate administrative authority, control and rescue services. The used containers should be disposed by delivering to eligible organizations.

6.3. Methods and material for containment and cleaning up

Secure damaged packaging. Collected product put in a substitute container and direct to the destruction or re-use.

6.4. Reference to other sections

Disposal - see Section 13. Personal protective equipment - see Section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Do not eat, drink, smoke or take drugs at work. Wash hands before breaks and after working with the product. Wear appropriate personal protective equipment. Take off contaminated clothing and wash before reuse. Ensure adequate ventilation at the workplace with the product.

7.2. Conditions for safe storage, including any incompatibilities

Keep in properly labeled, factory sealed containers, with a label which complies with current regulations. Store in tightly closed containers. Store in a dry, cool and well-ventilated storage room. Avoid direct sunlight.

7.3. Specific end use(s)

Fluorescent material. Used for scientific research and development.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Substance name	TWA	STEL	BLV	Notation
Tetrahydrofuran [CAS: 109-99-9]	150 mg/m ³ (UK/UE)	300 mg/m ³ (UK/UE)	-	skin

A skin notation assigned to the OEL identifies the possibility of significant uptake through the skin.

Legal basis: Ordinance on maximum permissible concentration and intensity of harmful factors in the work environment in accordance with national limit values.

EH40/2005 Workplace exposure limits, third edition, published 2018, ISBN 978 0 7176 6703 1.

Monitoring procedures: Use methods described in European Standards.

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8.2. Exposure controls

Mandatory general regulations on occupational health. Do not allow to exceed the normative concentrations of hazardous constituents in the workplace. After work, wash the body surface and clean the personal protective equipment. Do not eat, drink, smoke or take drugs at work. Wash hands and face during breaks and after working with the product.

Eye / face protection: Usually is not required.

Skin Protection: Usually is not required.

Respiratory protection: Usually is not required.

Thermal Hazards: Usually is not required.

Used personal protective equipment should meet the requirements of local/regional/national laws. The employer must provide personal protective equipment appropriate to the type of work and in accordance with all requirements, including maintenance and cleaning.

Concentrations of hazardous substances in the workplace should be monitored in accordance with acknowledged test methods. Mode, method, type and frequency of testing and measurement of harmful factors in the working environment should meet the requirements of local/regional/national laws.

Environmental exposure controls: The large amount of product should not be allowed to penetrate through the ground water, sewage, waste water or soil.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance:	White powder Nanomaterial in the form of a quantum dot
Odour:	Not applicable
Odour threshold:	Not applicable
pH:	Not applicable
Melting point/freezing point:	Not applicable
Initial boiling point and boiling range:	Not applicable
Flash point:	Not applicable
Evaporation rate:	Not applicable
Flammability (solid, gas):	Not applicable
Upper/lower flammability or explosive limits:	Not applicable
Vapour pressure:	Not applicable
Vapour density:	Not applicable
Relative density:	Not applicable
Solubility(ies):	According to the instructions
Partition coefficient: n-octanol/water:	Not applicable
Auto-ignition temperature:	Not applicable
Decomposition temperature:	Not applicable
Viscosity:	Not applicable
Explosive properties:	Not applicable
Oxidising properties:	Not applicable



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9.2. Other information

Not applicable.

SECTION 10: Stability and reactivity

10.1. Reactivity

Not reactive under normal conditions of use and storage.

10.2. Chemical stability

Stable under normal conditions of storage.

10.3. Possibility of hazardous reactions

Not applicable.

10.4. Conditions to avoid

Not applicable.

10.5. Incompatible materials

Not applicable.

10.6. Hazardous decomposition products

None under normal conditions of use and storage.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity: Based on available data, the classification criteria are not met.

IC₅₀ (Beas-2B cells, non-cancer) ≤ 8 µg /ml/24 h

No significant cytotoxic effect of the material on A549 (cancer) cells was observed.

Skin corrosion/irritation: Based on available data, the classification criteria are not met.

Serious eye damage/irritation: Based on available data, the classification criteria are not met.

Respiratory or skin sensitization: Based on available data, the classification criteria are not met.

Germ cell mutagenicity: Based on available data, the classification criteria are not met.

Carcinogenicity: Based on available data, the classification criteria are not met.

Reproductive toxicity: Based on available data, the classification criteria are not met.

STOT - single exposure: Based on available data, the classification criteria are not met.

STOT - repeated exposure: Based on available data, the classification criteria are not met.

Aspiration hazard: Based on available data, the classification criteria are not met.

Inhalation: Usually does not cause adverse health effects.

Skin contact: Usually does not cause adverse health effects.

Eye contact: Usually does not cause adverse health effects.

Ingestion: Usually does not cause adverse health effects.

SECTION 12: Ecological information

12.1. Toxicity

Very toxic to aquatic life with long lasting effects.

ECHA database for zinc oxide [CAS: 1314-13-2]:

Toxicity to fish:

LC₅₀ (*Oncorhynchus Mykiss*) 0.169 mg Zn/l (at neutral / high pH and low hardness)

LC₅₀ (*Pimephales promelas*) 0.780 mg Zn/l (at low pH and high hardness) and 0.330 mg Zn/l (at neutral/high pH, high hardness)



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For nanoparticle values:

LC₅₀ (Danio rerio) 1.44 mg Zn/l - 1.79 mg Zn/l

12.2. Persistence and degradability

Not specified.

12.3. Bioaccumulative potential

Not specified.

12.4. Mobility in soil

Not specified.

12.5. Results of PBT and vPvB assessment

Not applicable.

12.6. Other adverse effects

Not specified.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

During removal of waste comply with the regional / national laws.

Community legislation:

- Directive **2008/98/EC** of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives as amended.
- European Parliament and Council Directive **94/62/EC** of 20 December 1994 on packaging and packaging waste as amended.

Disposal methods for the product: Do not introduce into the environment. Disposal in accordance with the local/national legislation.

Disposal methods for used packing: Empty containers give for appropriate rubbish dump or for disposal in accordance with the local/national legislation. Dispose of uncleanable containers like of the product.

SECTION 14: Transport information

14.1. UN number

UN 3077

14.2. UN proper shipping name

ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.

14.3. Transport hazard class(es)

9

14.4. Packing group

III

14.5. Environmental hazards

Very toxic to aquatic life with long lasting effects.

14.6. Special precautions for user

During cargo handling use personal protective equipment - see Section 8.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not specified.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive



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1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC as amended.

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 as amended.

Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives as amended.

European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste as amended.

Commission directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

Commission directive 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC.

Commission directive 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.

Commission directive (EU) 2017/164 of 31 January 2017 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU.

15.2. Chemical safety assessment

The Chemical Safety Assessment has been performed for the mixture.

SECTION 16: Other information

The full text of H-statements from Sections 2 and 3:

H225 - Highly flammable liquid and vapour.

H319 - Causes serious eye irritation.

H335 - May cause respiratory irritation.

H351 - Suspected of causing cancer.

H400 - Very toxic to aquatic life.

H410 - Very toxic to aquatic life with long lasting effects.

Key to abbreviations and acronyms:

Aquatic Acute 1 - Hazardous to the aquatic environment - Acute Hazard, Category 1.

Aquatic Chronic 1 - Hazardous to the aquatic environment - Chronic Hazard, Category 1.

BLV - Biological Limit Value.

Carc. 2 - Carcinogenicity, Hazard Category 2.

Eye Irrit. 2 - Serious eye damage/eye irritation, Hazard Category 2.

Flam. Liq. 2 - Flammable liquids, Hazard Category 2.

IC₅₀ - Half maximal inhibitory concentration.

LC₅₀ - Median lethal concentration.

STEL - Short-Term Exposure Limit.

STOT SE 3 - Specific target organ toxicity - Single exposure, Hazard Category 3, Respiratory tract irritation.



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TWA - Time Weighted Average.

Training advice: Before use read the SDS.

Sources of key data:

Information provided electronically.

Database of the European Chemicals Agency (ECHA).

The information above is based on a current available data concerning the product, but also on the experience and knowledge in this field of the producer. They are neither a quality description of the product nor a guarantee of particular features. They are also treated as aid to safety in transport, storage and usage of the product. This does not free the user from the responsibility of improper usage of the information above also of improper compliance with the law norms in the field.

Prepared by ISOTOP Consulting Company; www.isotop.pl; e-mail: reach@isotop.pl

This SDS replaces and annuls all the previous versions.