

CANON OPTRON INC.
 SDS Number: EZ03
 Product Name: ZrO2

SAFETY DATA SHEET

rev. 8.0 Date of Issue 2013/10/16
 Revised Date 2024/3/15

SECTION 1 Chemicals and company identification

Product name	ZrO2
Product code	EZ03
Company name	CANON OPTRON INC.
Address	1744-1, Kanakubo, Yuki-shi, Ibaraki-ken, 307-0015 Japan
Section name	Sales Department
Telephone number	+81-296-21-3700
Fax number	+81-296-21-3770
Emergency telephone number	+81-296-21-3700
Use	Vacuum deposition material

SECTION 2 Hazards identification

GHS Classification (A classification by JIS Z 7252 "classification methods such as chemical substances based on GHS")


Physical hazards	Explosives	Classification not possible
	Flammable gases	Not applicable
	Aerosols	Not applicable
	Oxidizing gases	Not applicable
	Gas under pressure	Not applicable
	Flammable liquids	Not applicable
	Flammable solids	Classification not possible
	Self-reactive substances and mixtures	Classification not possible
	Pyrophoric liquids	Not applicable
	Pyrophoric solids	Classification not possible
	Self-heating substances and mixtures	Classification not possible
	Substances and mixtures which, in contact with water, emit flammable gases	Classification not possible
	Oxidizing liquids	Not applicable
	Oxidizing solids	Classification not possible
	Organic peroxides	Classification not possible
	Corrosive to metals	Classification not possible
	Desensitize explosives	Classification not possible
Health hazards	Acute toxicity(oral)	Classification not possible
	Acute toxicity(dermal)	Classification not possible
	Acute toxicity (Inhalation: Gases)	Not applicable
	Acute toxicity (Inhalation: Vapors)	Classification not possible

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	Acute toxicity (Inhalation: Dusts and mists)	Classification not possible
	Skin corrosion/irritation	Classification not possible
	Serious eye damage/eye irritation	Classification not possible
	Respiratory sensitization	Classification not possible
	Skin sensitization	Category 1
	Germ cell mutagenicity	Classification not possible
	Carcinogenicity	Classification not possible
	Reproductive toxicity	Classification not possible
	Reproductive toxicity, effects on or via lactation	Classification not possible
	Specific target organ toxicity(single exposure)	Classification not possible
	Specific target organ toxicity(repeated exposure)	Classification not possible
	Aspiration hazard	Classification not possible
Environmental hazards	Hazardous to the aquatic environment Short-term(acute)	Classification not possible
	Hazardous to the aquatic environment Long-term(chronic)	Classification not possible
	Hazardous to the ozone layer	Classification not possible
Label elements		
hazard Pictograms	Exclamation	
		
Signal word	Warning	
Dangerous goods hazard information	May cause an allergic skin reaction.	
Precautionary statements		
【Safety measures】	Avoid breathing dust/fume/gas/mist/vapours/spray. Contaminated work clothing should not be allowed out of the workplace. Wear Protective glovess/protective clothing/eye protection/face protection.	

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【First-aid measures】	IF ON SKIN: Wash with plenty of soap and water. Specific treatment . If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
【Storage】	-
【Disposal】	Dispose of contents/container in accordance with national regulations.
【Other hazards】	-

SECTION 3 Composition/information on ingredients

Substance/Mixture	Mixture
Chemical name	Zirconium oxide
Chemical formula	ZrO2
Concentration or concentration range	99.9% (include HfO2)
CAS No.	1314-23-4
TSCA Inventory	Zirconium oxide (ZrO2)
EINECS number	215-227-2
Radioactive information	Radioactive substances are not used as the material. Therefore, there is no reason that ionizing radiation would be generated.

SECTION 4 First aid measures

Inhalation	Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell.
Skin contact	Take off immediately all contaminated clothing. Rinse affected areas with water/shower. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: : Get medical advice/attention.
Eye contact	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
Ingestion	Rinse mouth. Get medical advice/attention.
Most important symptoms and effects, both acute and delayed	No data available
Protection of first aiders	Rescuers, wear suitable protective equipment as the situation demands.
Special precautions for physicians	No data available

SECTION 5 Firefighting measures

Suitable extinguishing media	Water spray, foam, carbon dioxide, powder fire extinguisher.
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Unsuitable extinguishing media	Because a fire might spread through the outskirts, It avoid direct stick irrigation.
Specific hazards	As a general precaution, in the case of powdered materials, dust explosions can be caused under certain conditions.
Specific extinguishing methods	Cut off the source of combustion to the origin of the fire, and use a fire extinguishing agent to extinguish the fire. Cool surrounding tanks, buildings, etc. by spraying water to prevent the spread of fire. It performs the fire fighting from windward. Restrict access to the area around the fire location to persons other than those involved with the fire. If it is not dangerous to do so, move the container out of the fire area.
Special protective equipment for firefighters	Wear appropriate self-contained equipment for respiratory organ protection and protective clothing (heat-resistant) for eye and skin protection during firefighting operations.

SECTION 6 Accidental release measures

Personal precautions, protective equipment, and emergency procedures	It prohibits the entrance except the person concerned. The worker wears appropriate personal protective equipment (in item of "8.revelation prevention and protection measures" reference) and avoids eyes, contact and inhalation to skin.
Environmental precautions	It avoids an outflow to the environmental average of the product to have possibilities to influence neighboring environment.
Methods and material for containment and cleaning up	Sweep up scattered material or use suction by a vacuum cleaner or the like to prevent scattering and dust emission as much as possible, and collect the material in an empty container. No eating and drinking in the vicinity of handling and storage areas. Promptly remove all sources of ignition (no smoking, sparks, or flames in the vicinity). Prevent inflow into drains, sewers, basements, or closed areas.
Secondary disaster prevention measures	No data available

SECTION 7 Handling and storage

Precautions for safe handling	
Technical measures	Take measures for equipment as described in "8. Exposure controls/personal protection" and wear protective equipment.
Safety handling precautions	Avoid breathing dust/fume/gas/mist/vapours/spray. Wear Protective gloves/protective clothing/eye protection/face protection. Avoid generating dust.
Avoidance of contact	No data available
Hygiene measures	Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

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including any incompatibilities

Safe storage conditions

The storage area shall be equipped with the necessary lighting and ventilation equipment to store or handle dangerous or hazardous substances.
To take preventive measures against electrostatic discharge.

Safety packaging material

It uses the container which it can seal up without damage and the leak.

SECTION 8 Exposure controls/personal protection

ZrO2

Permissible concentration

ACGIH

TLV-TWA: 5 mg/m³
TLV-TWA: 10 mg/m³
(as zirconium and compound, zirconium)
(2015 version)

Appropriate engineering controls

In the work shop which dust produces, it uses a device, an apparatus sealed up by all means or a local ventilator.

Individual protection measures,
such as personal protective
equipment

Respiratory protection

Dustproof mask

Hand protection

Protective gloves

Eye/face protection

Dust-proof glasses

Skin protection

Protective clothing

SECTION 9 Physical and chemical properties

Appearance

Physical state

Solid

Form

Pellets, granules

Colour

White

Odour

None

ZrO2

Melting point/freezing point

2,680°C (Merck(15th,2013))

Boiling point or initial boiling point
and boiling range

4300°C

Flammability

No data available

Upper/lower flammability or
explosive limits

No data available

Flash point

Noninflammability (GESTIS (2015))

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Auto-ignition temperature	Noninflammability (GESTIS (2015))
Decomposition temperature	No data available
pH	No data available
Kinematic viscosity	No data available
Solubility	
Water	Insoluble
Other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Vapour pressure	No data available
Density and/or relative density	No data available
(Density)	※ 3.90 ~ 5.15 (pellet) as ZrO2
Relative vapor density	No data available
Particle characteristics	No data available
Other information	No data available

SECTION 10 Stability and reactivity

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Reactivity	No data available
Chemical stability	No data available
Possibility of hazardous reactions	No data available
Conditions to avoid	No data available
Incompatible materials	No data available
Hazardous decomposition products	No data available

SECTION 11 Toxicological information

ZrO2

Acute toxicity(oral)	No data available
Acute toxicity(dermal)	No data available
Acute toxicity (Inhalation: Gases)	Solid (GHS definition)
Acute toxicity (Inhalation: Vapours)	Solid (GHS definition)
Acute toxicity (Inhalation: Dusts and mists)	No data available
Skin corrosion/irritation	No data available

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Serious eye damage/irritation	No data available
Respiratory or skin sensitization	The classification is not possible due to lack of data. Besides, in DFGOT vol. 12 (1999), zirconium and its compounds are classified as a respiratory sensitizer from the information on zirconium and other zirconium compounds, but this substance was classified as "Classification not possible" due to no information on the substance. It is reported that this substance causes Granulomatous skin reactions in humans (DFGOT vol. 12 (1999)). In DFGOT vol. 12 (1999), zirconium and its compounds are classified as a sensitizer (Sah). From the above, this substance was classified in Category 1.
Germ cell mutagenicity	No data available
Carcinogenicity	As described in this hazard class for zirconium (CAS number: 7440-67-7), ACGIH classified zirconium and its compounds in A4 in carcinogenicity (ACGIH (7th, 2001)). Therefore, this substance was classified as "Classification not possible" for this hazard class.
Reproductive toxicity	No data available
Specific target organ toxicity(single exposure)	No data available
Specific target organ toxicity(repeated exposure)	As for humans, it is reported that effects on lungs were not observed in workers exposed to this substance (DFGOT vol. 12 (1999)). On the other hand, changes in the lung (asthma, bronchitis, pneumoconiosis, sarcoid granulomatosis, granulomatous interstitial pneumonia) were reported, but it is reported that association with this substance is not clear because they were also exposed to other substances that could cause lung damage (DFGOT vol. 12 (1999)). However, there are cases where zirconium was confirmed in granulomatous lesions in the lungs of three, and extrinsic allergic alveolitis was observed just in one. It is reported that histological examination of the lungs revealed "various stages of epithelioid cell granuloma induced by foreign matter" with foreign matter inclusions in giant cells and fibrosis, and the principal component of foreign matter is zirconium, and similar changes were also found in skin, and granulomatous lesions were observed in mammary and axillary lymph nodes (DFGOT vol. 12 (1999)). As for experimental animals, it is reported that toxic effects were not found in an inhalation toxicity test using rats, rabbits, dogs, guinea pigs, and cats (DFGOT vol. 12 (1999), ACGIH (7th, 2001)). It is also reported that in a diet administration test using rats, toxic effects were not observed (DFGOT vol. 12 (1999)). As above, because effects of this substance cannot be denied completely in humans, the substance was classified as "Classification not possible."
Aspiration hazard	No data available
Other information	No data available

SECTION 12 Ecological information

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Toxicity

Hazardous to the aquatic environment Short-term(acute)

No data available

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Hazardous to the aquatic environment Long-term(chronic)	No data available
Persistence and degradability	No data available
Bioaccumulative potential	No data available
Mobility in soil	No data available
Hazard to the ozone layer	No data available
Other adverse effects	No data available

SECTION 13 Disposal considerations

Waste treatment methods	Process is contracted to industrial waste disposers who received approval of a prefectural governor.
Contaminated container and contaminated packaging	The container is recycled after being cleaned, or is appropriately processed according to the standards of related laws and regulations. When disposing of empty containers, the contents should be completely removed.

SECTION 14 Transport information

ZrO2

International regulation

UN number	Not applicable
UN proper shipping name	Not applicable
UN classification	Not applicable
Transport hazard class	Not applicable
Packing group	Not applicable
Hazardous to the aquatic environment	No data available
Maritime transport in bulk according to IMO instruments	No data available
Japanese laws and regulations	Land regulation information Not applicable Maritime regulatory information non-hazardous materials Aviation regulatory information non-hazardous materials
Special precautions for users	Requires retention of yellow card when transporting. When transporting, protect from direct sunlight and take on cargo without breakage of container, corrosion and leakage.
Special Provisions	-

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SECTION 15 Regulatory information (Japan)

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Occupational Safety and Health Law	There is it in the case of an application or an application
PRTR Law	Not applicable
Poisonous and Deleterious Substances control Law	Not applicable
Labor Standards Act	There is it in the case of an application or an application
Chemical substances control Law	Not applicable
Fire fighting Law	Not applicable
Air Pollution Control Act	Not applicable
Water Pollution Prevention Act	Not applicable
Water Supply Act	Not applicable
Sewerage Act	Not applicable
Marine Pollution Prevention Law	Not applicable
Waste Management and Public Cleansing Act	Not applicable
Note	Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

SECTION 16 Other information

The Safety Data Sheet (SDS) has been prepared based on currently available materials, information and data, and may be revised based on new information. Further, the important points in the SDS are made for the purpose of normal handling.

When handling the user product in a specialized manner, take the appropriate safety measures for the application or method.

Further, Canon Optron Inc. has paid sufficient attention to the described contents of the SDS, but does not guarantee the accuracy of its contents.

The SDS prepared by our company includes all findings from our investigation for reference. Not applicable to all items listed.

Literature Reference

[WEB site]

National Institute of Technology and Evaluation Homepage

Japan Advanced Information Center of Safety and Health Homepage

Ministry of Health, Labour and Welfare Homepage

[Regulatory review Tools]

ezCRIC+ (Japan Chemical Database Ltd)