

CANON OPTRON INC.
 SDS Number: EC03
 Product Name: CeO2 (A, C)

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	CeO2 (A, C)
Product code	EC03
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
Health hazards	Desensitize explosives	Classification not possible
	Acute toxicity(oral)	Not classified
	Acute toxicity(dermal)	Not classified
	Acute toxicity (Inhalation: Gases)	Not applicable
	Acute toxicity (Inhalation: Vapors)	Classification not possible
	Acute toxicity (Inhalation: Dusts and mists)	Not classified
	Skin corrosion/irritation	Not classified
Serious eye damage/eye irritation	Not classified	

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	Respiratory sensitization	Classification not possible
	Skin sensitization	Classification not possible
	Germ cell mutagenicity	Not classified
	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)	Category 2
	Specific target organ toxicity(repeated exposure)	Category 1
	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	Health Hazard	
		
Signal word	Danger	
Dangerous goods hazard information	May cause damage to organs Lungs. Causes damage to organs through prolonged or repeated exposure Lungs.	
Precautionary statements		
【Safety measures】	Do not breathe dust/fume/gas/mist/vapours/spray. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.	
【First-aid measures】	If exposed or concerned: Call poison center or doctor/physician. Get medical advice/attention if you feel unwell. Specific treatment.	
【Storage】	Store locked up.	
【Disposal】	Dispose of contents/container in accordance with national regulations.	
【Other hazards】	-	

SECTION 3 Composition/information on ingredients

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Substance/Mixture	Substance
Chemical name	Cerium oxide
Chemical formula	CeO2
Concentration or concentration range	99.9%<
CAS No.	1306-38-3
TSCA Inventory	Cerium oxide (CeO2)
EINECS number	215-150-4
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 fire extinguishing agent, powder fire extinguishing agent , carbon dioxide gas, dry sand such
Unsuitable extinguishing media	No data available
Specific hazards	Is a non-flammable, itself does not burn, but there is a risk which break down when heated, to generate fumes and toxic or corrosive /. Is likely to generate toxic gases irritating, corrosive and fire.
Specific extinguishing methods	It move a container from the fire area if not dangerous. Eliminate all ignition sources if safe to do so.
Special protective equipment for firefighters	It wear appropriate respiratory air, the protective clothing (heat resistance).

SECTION 6 Accidental release measures

Personal precautions, protective equipment, and emergency procedures	Immediately, It isolate leakage area as the appropriate distance in all directions.
Environmental precautions	It should not be released to the environment.

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Methods and material for containment and cleaning up	Moisten with water to reduce dust in the air and prevent dispersion. Collection and neutralization: Sweep up leaked material and collect it in an empty container for later waste disposal.
Secondary disaster prevention measures	Was covered with a plastic sheet to prevent scattering.

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	Do not inhale dust, fumes, vapors, spray.
Avoidance of contact	Refer to "10. Stability and reactivity."
Hygiene measures	Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.

Conditions for safe storage, including any incompatibilities

Safe storage conditions	Store locked up.
Safety packaging material	No data available

SECTION 8 Exposure controls/personal protection

CeO2

Permissible concentration

ACGIH

No data available

Appropriate engineering controls

The workshop handling or storage of this material, it is recommended that you install the appropriate safety shower and eye wash.
In order to prevent the exposure, it is recommended that you install the appropriate general ventilation equipment, local exhaust ventilation in the workplace.

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	Pale yellow
Odour	None

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CeO₂

Melting point/freezing point	2480°C
Boiling point or initial boiling point and boiling range	3730°C
Flammability	No data available
Upper/lower flammability or explosive limits	No data available
Flash point	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
pH	No data available
Kinematic viscosity	No data available
Solubility	
Water	Insoluble
Other solvents	And insoluble in solvents
Partition coefficient: n-octanol/water	No data available
Vapour pressure	No data available
Density and/or relative density	7.21
(Density)	※ 4.0 ~ 4.4 (pellet) as CeO ₂ (A, C)
Relative vapor density	No data available
Particle characteristics	No data available
Other information	No data available

SECTION 10 Stability and reactivity

CeO₂

Reactivity	No data available
Chemical stability	It is considered stable.
Possibility of hazardous reactions	Do not react in the storage conditions and normal handling. It will generate NO _x gas in the reaction of chlorine gas, and nitric acid reaction with hydrochloric acid.
Conditions to avoid	High-temperature and humidity
Incompatible materials	Carbon dioxide, acid
Hazardous decomposition products	Acid mist is generated upon dissolution of the acid.

SECTION 11 Toxicological information

CeO₂

Acute toxicity(oral)	Rat LD50 value:> 5000 mg / kg bw (IUCLID (2000))
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Acute toxicity(dermal)	Based on the result that administration of 2000 mg/kg bw to rats caused no mortality, and LD50 value was > 2000 mg/kg bw (IUCALID (2000)), the substance was classified as "Not classified".
Acute toxicity (Inhalation: Gases)	Solid (GHS definition)
Acute toxicity (Inhalation: Vapours)	No data available
Acute toxicity (Inhalation: Dusts and mists)	Based on the rat LC50 value of 5.05 mg/L (OECD TG 403) (IUCALID (2000)), the substance was classified as "Not classified" in the JIS classification (corresponding to Category 5 in the UN-GHS classification). According to the description that the test particles which was less than 3 micrometer in particle diameter were account for 85.4% (IUCALID (2000)), the criterion values for dust/mist were adopted.
Skin corrosion/irritation	In the rabbit test (OECD TG404), application of 0.5 g of test substance caused no irritation (IUCALID (2000)). In another rabbit test, the primary skin irritation index value was 0.0 and it was concluded that the substance was not irritating (IUCALID (2000)). Based on the information, the substance was classified as "Not classified".
Serious eye damage/irritation	In the rabbit test (OECD TG405), instillation of 0.1 g of test substance to eye resulted in non-irritating (IUCALID (2000)). In another rabbit test, slightly irritating was reported (IUCALID (2000)). Based on the information, the substance was classified as "Not classified".
Respiratory or skin sensitization	In the maximization test using guinea pigs (OECD TG406), no reaction of sensitization was observed after elicitation, and concluded as a non-sensitizer (IUCALID (2000)). However, since it was the "List 2" information source designated in the GHS classification guidance for the Japanese government, the substance was classified as "Classification not possible".
Germ cell mutagenicity	The substance was classified as "Classification not possible" due to the negative results in the micronucleus test (OECD TG474) using bone marrow cells of mice orally administered (in vivo mutagenicity test in somatic cells) (IUCALID (2000)). As relevant information, as for in vitro study, negative results in the Ames test were reported (Initial Environmental Risk Assessment of Chemicals (Ministry of the Environment), vol. 8 (2010)).
Carcinogenicity	No data were available. As relevant information, the US EPA reports that the data of this substance are insufficient to evaluate the possibility of carcinogenicity in humans under the carcinogenicity risk assessment guidelines (IRIS (2009) Tox Review).
Reproductive toxicity	No data available
Specific target organ toxicity(single exposure)	In the acute inhalation study in rats exposed to dust for 4 hours at the range of concentrations from 4.12 to 5.98 mg/L (OECD TG 433, GLP-compliant), labored respiration and ruffled fur were noted in two of ten animals, and the lungs of all animals were incompletely collapsed with diffuse whitish foci (IUCALID (2000)). Based on these findings observed in the concentration corresponding nearly to the upper limit within Category 2 of the guidance values, the substance was classified as Category 2 (lung). In addition, in the acute oral toxicity study in rats administered up to 5000 mg/kg bw, no mortality was recorded, body weight gain was normal, and no abnormalities were observed at necropsy (IUCALID (2000)).

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Specific target organ
 toxicity(repeated exposure)

In the lungs of the workers exposed for many years to the fumes of rare-earth elements such as cerium, accumulation of rare-earth elements was observed, and lung lesions such as granuloma, emphysema, or interstitial fibrosis and decrease of pulmonary breathing capacity were reported (Initial Environment Risk Assessment of Chemicals (Ministry of Environment), vol. 8 (2010)). Many reports were published describing long-term residue of rare earth elements in lung and numerous cases of workers who developed adverse lung effects associated with cerium oxide as follows. In the case of the 58-year-old worker who came to hospital complaining of dyspnea at least 15 years after exposures to cerium oxide polishing agents, slight pleural thickening, and pulmonary obstruction were noted. He was diagnosed by histopathological examination as chronic pachypleuritis (Initial Environment Risk Assessment of Chemicals (Ministry of Environment), vol. 8 (2010)). In the case of 68-year-old man who was engaged in the abrasive operation of the optical lens for 35 years, rare earth pneumoconiosis associated with cerium oxide exposure was identified after 13 years of separation of work (PATTY, 5th (2001)). On the other hand, in the 13-week repeated inhalation study in rats exposed to dust, enlargement and discoloration of diaphragm in approximately half of the animals, changes of bronchial lymph nodes in all animals were found at 5 mg/m³ or higher, and discoloration of the lungs in all animals at 51 mg/m³ or higher at necropsy. Histopathologically, lymphoid hyperplasia and pigmentation in the bronchial lymph nodes, and pigmentation in the lung were noted at 5 mg/m³ or higher in both sexes, and alveolar epithelial hyperplasia in the lungs and metaplasia and pigmentation in the larynx were noted at 51 mg/m³ or higher in both sexes (Initial Environment Risk Assessment of Chemicals (Ministry of Environment), vol. 8 (2010)). These effects were observed at doses within Category 1 of the guidance values. Based on the findings for both humans and experimental animals, the substance was classified as Category 1 (lung).

Aspiration hazard

No data available

Other information

No data available

SECTION 12 Ecological information

CeO2

Toxicity

Hazardous to the aquatic
 environment Short-
 term(acute)

No data available

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

This substance is not listed in Annexes to the Montreal Protocol.

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.

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SECTION 14 Transport information

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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	No data available
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. Do not transport with food and feedstuffs. Do not stack heavy good thereupon.
Special Provisions	-

SECTION 15 Regulatory information (Japan)

CeO2

Occupational Safety and Health Law	No data available
PRTR Law	There is it in the case of an application or an application
Poisonous and Deleterious Substances control Law	No data available
Labor Standards Act	No data available
Chemical substances control Law	No data available
Fire fighting Law	No data available
Air Pollution Control Act	No data available
Water Pollution Prevention Act	No data available
Water Supply Act	No data available
Sewerage Act	No data available
Marine Pollution Prevention Law	No data available
Waste Management and Public Cleansing Act	No data available
Note	Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

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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

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National Institute of Technology and Evaluation Homepage
Japan Advanced Information Center of Safety and Health Homepage
Ministry of Health, Labour and Welfare Homepage

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