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SECTION 1 Chemicals and company identification

> OH-6Product name Product code EO26

CANON OPTRON INC. Company name

Address 1744-1, Kanakubo, Yuki-shi, Ibaraki-ken, 307-0015 Japan

Section name Sales Department Telephone number +81-296-21-3700 +81-296-21-3770 Fax number Emergency telephone tumber +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 Classification not possible

contact with water, emit flammable

gases

Not applicable Oxidizing liquids

Oxidizing solids Classification not possible Organic peroxides Classification not possible Corrosive to metals Classification not possible Desensitize explosives Classification not possible Acute toxicity(oral) Classification not possible

Health hazards

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 Category 2

Reproductive toxicity Classification not possible

Reproductive toxicity, effects on or via Cla

lactation

Classification not possible

Specific target organ toxicity(single

exposure)

Classification not possible

Specific target organ toxicity(repeated Ca

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



Signal word

Danger

Dangerous goods hazard information

May cause an allergic skin reaction. Suspected of causing cancer.

Causes damage to organs through prolonged or repeated exposure Respiratory organs.

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Precautionary statements

[Safety measures] Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust/fume/gas/mist/vapours/spray. Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Contaminated work clothing should not be allowed out of the workplace. Wear Protective glovess/protective clothing/eye protection/face protection.

[First-aid measures] IF ON SKIN: Wash with plenty of soap and water.

IF exposed or concerned: Get medical advice/attention.

Get medical advice/attention if you feel unwell.

Specific treatment.

If skin irritation or rash occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.

[Storage] Store locked up.

[Disposal] Dispose of contents/container in accordance with national regulations.

[Other hazards] -

SECTION 3 Composition/information on ingredients

Substance/Mixture Mixture

Concentration or concentration

range

99.9<

 CAS No.
 1314–23–4
 13463–67–7
 7440–03–1

 TSCA Inventry
 Zirconium oxide (ZrO2)
 Titanium oxide (TiO2)
 Niobium

 EINECS number
 215–227–2
 236–675–5
 231–113–5

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 rising.

If eye irritation persists: Get medical advice/attention.



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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 This product itself is not flammable.

Unsuitable extinguishing media No data available
Specific hazards No data available

Specific extinguishing methods
In the case of a fire in the periphery, the portable container is quickly moved to a

safe place.

Special protective equipment for

firefighters

Wear suitable protective equipment (gloves, glasses and a mask) in fire-fighting.

SECTION 6 Accidental release measures

Personal precautions, protective equipment, and emergency

procedures

Protection equipment (specified as those in which the properties of the product are suitable) worn during operation so that airborne droplets, etc., do not adhere to the skip and duete and groups are not absorbed.

to the skin and dusts and gases are not absorbed.

Environmental precautions

The leakage may not directly flow into rivers or sewage.

Methods and material for containment and cleaning up

The leaked material is scooped up, or swept up and gathered to be recovered in a paper bag or a drum.

a paper bag or a drum.

After recovery, a small amount of the residue is absorbed in sediment, sawdust,

etc.

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 Handling work must be practiced in a room where there is a local or total

ventilation facility.

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.

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Conditions for safe storage, including any incompatibilities

Safe storage conditions Store in a well-ventilated place. Keep container tightly closed.

Should be stored separately (Al, Ca, Mg, K, Na, Zn, and Li) with strong acids,

metals.

Store locked up.

Safety packaging material No data available

SECTION 8 Exposure controls/personal protection

ZrO2 <u>TiO2</u> <u>Nb</u>

Permissible concentration

ACGIH

TLV-TWA: 5 mg/m³ TLV-TWA: 10 mg/m³ No data available

TLV-TWA: 10 mg/m³ (titanium dioxide)
(as zirconium and (2016 version)
(2015 version)

possibl

Individual protection measures, such as personal protective equipment

Respiratory protection

Dustproof mask

Hand protection Protective gloves

Skin protection Protective clothing

SECTION 9 Physical and chemical properties

Appearance

Physical state Solid

Form Pellets, granules

Colour Gray
Odour None

<u>ZrO2</u> <u>TiO2</u> <u>Nb</u>

4300℃

Boiling point or initial boiling point

and boiling range

Flammability

No data available

No data available

No data available

2500∼3000℃

4742℃

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No data available

No data available

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Upper/lower flammability or No data available No data available No data available explosive limits Noninflammability No data available No data available Flash point (GESTIS (2015)) Auto-ignition temperature Noninflammability Noninflammability (HSDB No data available (GESTIS (2015)) (2016)) Decomposition temperature No data available 1,860°C (GESTIS (2016)) No data available SUSPENSION IN WATER pН No data available No data available (1 IN 10) IS NEUTRAL TO LITMUS (HSDB (2016)) Kinematic viscosity No data available No data available No data available Solubility Insoluble Insoluble Water Insoluble No data available No data available Other solvents No data available No data available Partition coefficient: n-No data available No data available octanol/water Vapour pressure No data available No data available No data available 4.23 8.56 Density and/or relative density No data available (Density)

No data available

SECTION 10 Stability and reactivity

Other information

Relative vapor density

Particle characteristics

ZrO2 TiO2 Nb No data available It is stable under the No data available Reactivity normal handling condition. No data available It is stable under the It is stable in storage Chemical stability normal handling condition. conditions and normal handling. Possibility of hazardous reactions No data available Dangerous adverse It want to generate reaction is not caused hydrogen response to under the normal handling hydrofluoric acid. condition. And chlorine, react at 200 °C or more, resulting in a niobium pentachloride. The nitrogen, the reaction was at 1000 °C or more, resulting in a nitride.

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Conditions to avoid	No data available	It avoid direct rays of the sun and keep it in the cool and dark space.	No data available
Incompatible materials	No data available	Oxidizer, reducer	No data available
Hazardous decomposition products	No data available	In the case of fires, a toxic decomposition product may occur.	No data available

SECTION 11 Toxicological information

	<u>ZrO2</u>	<u>TiO2</u>	<u>Nb</u>
Acute toxicity(oral)	No data available	For a rat LD50 price,> 2,000 mg/kg,> 5,000 mg/kg (SIDS (2015)),> 10,000 mg/kg (HSDB (Access on May 2016), Ministry of the Environment risk evaluation Vol. 8 (2010)) ,> 12,000 mg/kg,> 20,000 mg/kg (Ministry of the Environment risk evaluation Vol. 8 (2010)) There is a report.	Oral – Rat LD:> 10g/kg Intraperitoneal – rat LD:> 10g/kg Oral – mouse LD:> 10g/kg Intraperitoneal – mouse LD:> 10g/kg
Acute toxicity(dermal)	No data available	For an LD50 price of the hamsters,> 10,000 mg/kg (HSDB (Access on May 2016), Ministry of the Environment risk evaluation Vol. 8 (2010)) There is a report.	No data available
Acute toxicity (Inhalation: Gases)	Solid (GHS definition)	Solid (GHS definition)	If inhaled, nasal, throat is stimulated.
Acute toxicity (Inhalation: Vapours)	Solid (GHS definition)	Solid (GHS definition)	No data available
Acute toxicity (Inhalation: Dusts and mists)	No data available	Based on a report of an LC50 value for rats of > 5.09 mg/L (SIDS (2015)), it was classified as "Not classified."	No data available
Skin corrosion/irritation	No data available	From descriptions (SIDS (2015)) of slight or no irritation in skin irritation tests using rabbits, it was classified as "Not classified" (Category 3 in UN GHS classification).	No data available

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Serious eye damage/irritation No data available There is a report that in To give a foreign body an eye irritation test sensation Once in the (OECD TG 405) using eye, it is irritating to the rabbits. mild coniunctival eves. redness was observed in 2 out of 3 animals 24 hours after the application, but disappeared within 48 hours, and there is a report that slight irritation was observed 24 hours after the application, but no irritation was observed after 48 and 72 hours (SIDS (2015)). The irritation observed in these tests may be thought to be due to physical stimulation, however, since the particle shape could not be confirmed, it was classified as "Classification not possible. Respiratory or skin sensitization The classification is not Both a skin sensitization No data available possible due to lack of test using the guinea pigs data. (Buehler method, OECD Besides, in DFGOT vol. TG 406) and a skin 12 (1999), zirconium and sensitization test using mice (LLNA method, its compounds are classified as a respiratory OECD TG 429) were sensitizer from the negative, and it was information on zirconium judged that this and other zirconium substance doesn't have compounds, but this skin sensitizing potential substance was classified (SIDS (2015)). Therefore, as "Classification not it was classified as "Not possible" due to no classified. 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.

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No data available

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Germ cell mutagenicity

No data available

reported that micronucleus tests using peripheral erythrocytes or bone marrow cells of mice were negative, an hprt gene mutation assay using alveolar cells of rats was positive, a chromosomal aberration test using mouse bone marrow cells and a DNA damage test in rat lungs were negative (SIDS (2015). National Institute of Advanced Industrial Science and Technology (2011), DFGOT (2014), Environmental Risk Assessment for Chemical Substances Vol. 8 (Ministry of the Environment, 2010), IARC 93 (2010)). As for in vitro, negative results were reported in all of bacterial reverse mutation tests, micronucleus tests. chromosome aberration tests, and mouse lymphoma assays using cultured mammalian cells (SIDS (2015), OEL Documentations (Japan Society For Occupational Health (JSOH), 2013), National Institute of Advanced Industrial Science and Technology (2011), IARC 93 (2010), Environmental Risk Assessment for Chemical Substances Vol. 8 (Ministry of the Environment, 2010). DFGOT (2014)). In addition, it is evaluated in SIDS (2015) that it is not possible to conclude on the genotoxicity of this substance because positive in vivo findings are not by standard tests. From the above, it was classified as "Classification not

As for in vivo, it was

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possible. ´

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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.

In a large-scale cohort study in Europe, the mild increase of the risk of the lung cancer was suggested by the occupation revelation to this material, but it was said to this material revelation and association with the carcinogenesis that the carcinogenic evidence in the Homo sapiens was restrictive in others which a doseresponse relationship was not seen in in revelation group, a cohort study in the North America and the case-control study without being shown (IARC 93 (2010)). Increase of the frequency of adenoma of the lungs and the squamous cancer was seen in a rat in one inhalational examination that came to light in the experimental animals in high density group (250 mg/m³) for two years (IARC 93 (2010), SIDS (2015)) . In addition, increase (32/100 vs. control group 1/271) of the outbreak frequency of the lung tumor (benign squamous epithelium tumor, squamous cancer, adenoma. adenocarcinoma) was seen in the revelation group, but oncogenic increase was not seen even in the examination that inhaled super finer particles (P25) of this material to a rat for two vears, and came to light in the murine examination (IARC 93 (2010)) . In addition, it was admitted the frequency increase of the benign and malignant lung tumor in the intratracheal examination that It injected to lat with titanium oxide. On the other hand, the increase of tumor was not seen in a rat, a mouse in oral, subcutis, neither examination that It gave

No data available

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Specific target organ toxicity(single exposure)	No data available	test is a screening test, it was not possible to classify this substance as "Not classified" only from this result, and there is no other data available for classification. Therefore, the classification was not possible due to lack of data. No data available	No data available
		,	
Reproductive toxicity	No data available	In a reproduction/developmen tal toxicity screening test (OECD TG 421) using	No data available
		intraperitoneally (IARC 93 (2010)). It classified the IARC in group 2B than the above saying that there was carcinogenic enough evidence in the experimental animals (IARC 93 (2010)). In addition, Nihon Sangyo hygiene society classifies it in second group B as a temporary classification (advice (2015) of the acceptable concentration)	

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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

There is no information on humans. As for experimental animals, in a 2-vear inhalation toxicity test using rats, increases in leukocyte and neutrophil counts, and increase in pneumonia, tracheitis, and rhinitis with squamous metaplasia in the anterior nasal cavitv were observed at 10 mg/m³ which is in the range of Category 1, and in a 24month inhalation toxicity study using rats, lung fibrosis, minor changes in cytologic pattern in bronchoalveolar lavage fluid (BALF), a slight increase in polymorphonuclear leukocyte count, increase in macrophage and hyperplasia of the lung-

m³ (SIDS (2015)). Besides, as for oral route. no effects were observed even at doses corresponding to "Not classified" in 13-week or 103-week repeated dose toxicity tests using rats or mice dosed by feeding (Environmental Risk Assessment for Chemical Substances Vol. 8 (Ministry of the Environment, 2010)). Therefore, it was classified in Category 1 (respiratory organs).

associated lymph nodes were observed at 5 mg/

No data available

not observed (DFGOT vol.

12 (1999)).

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As above, because effects of this substance cannot be denied completely in humans, the substance was classified as "Classification not possible."		
No data available	No data available	No data available

Aspiration hazard

Other information

No data available

SECTION 12 Ecological information

<u>ZrO2</u> <u>TiO2</u> <u>Nb</u>

Toxicity

Hazardous to the aquatic environment Short-term(acute)

Hazardous to the aquatic environment Long-term(chronic)

No data available	From 72-hour EL50 (growth rate) > 100 mg/L for algae (Pseudokirchneriella subcapitata), 48-hour EL50 > 100 mg/L for crustacea (Daphnia magna), and 96-hour LL50 > 100 mg/L for fish (Oryzias latipes) (all SIDS, 2015), it was classified as "Not classified."	No data available
No data available	Reliable chronic toxicity data were not obtained. It is poorly water—soluble (insoluble in water, ICSC, 2002), and classified as "Not classified" for acute toxicity, but due to the unknown environmental behavior of the inorganic compound, it was classified in Category 4.	No data available
No data available	No data available	No data available
No data available	No data available	No data available
No data available	No data available	No data available
No data available	No data available	No data available
No data available	No data available	No data available

SECTION 13 Disposal considerations

Mobility in soil

Waste treatment methods

Hazard to the ozone layer
Other adverse effects

Persistence and degradability
Bioaccumulative potential

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

	<u>ZrO2</u>	<u>TíO2</u>	<u>Nb</u>
International regulation			
UN number	Not applicable	Not applicable	Not applicable
UN proper shipping name	Not applicable	Not applicable	Not applicable
UN classification	Not applicable	Not applicable	Not applicable
Transport hazard class	Not applicable	Not applicable	Not applicable
Packing group	Not applicable	Not applicable	Not applicable
Hazardous to the aquatic environment	No data available	No data available	No data available
Maritime transport in bulk according to IMO instruments	No data available	No data available	No data available
Japanese lows and regulations	Land regulation information Not applicable Maritime regulatory information non- hazardous materials Aviation regulatory information non- hazardous materials	Land regulation information Not applicable Maritime regulatory information non- hazardous materials Aviation regulatory information non- hazardous materials	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.	When transporting, protect from direct sunlight and take on cargo without breakage of container, corrosion and leakage. Do not stack heavy good thereupon.	No data available
Special Provisions	-	_	_

SECTION 15 Regulatoly information (Japan)

	<u>Zr02</u>	<u>TiO2</u>	<u>Nb</u>
Occupational Safety and Health Law	There is it in the case of an application or an application	There is it in the case of an application or an application	Not applicable
PRTR Law	Not applicable	Not applicable	Not applicable
Poisonous and Deleterious Substances control Law	Not applicable	Not applicable	Not applicable
Labor Standards Act	Not applicable	Not applicable	Not applicable
Chemical substances control Law	Not applicable	Not applicable	Not applicable
Fire fighting Law	Not applicable	Not applicable	Not applicable



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Air Pollution Control Act

Water Pollution Prevention Act

Water Supply Act

Sewerage Act

Marine Pollution Prevention Law

Waste Management and Public Cleansing Act Note

Not applicable	Not applicable	Not applicable
Not applicable	Not applicable	Not applicable
Not applicable	Not applicable	Not applicable
Not applicable	Not applicable	Not applicable
Not applicable	There is it in the case of an application or an application	Not applicable
Not applicable	Not applicable	Not applicable

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)