

CANON OPTRON INC.

SDS Number: EB01C

Product Name: BaF2 (Optical Crystal)

SAFETY DATA SHEET

rev. 7.0 Date of Issue 2014/9/1
Revised Date 2022/5/13

SECTION 1 Chemicals and company identification

Product name	BaF2 (Optical Crystal)
Product code	EB01C
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	Optical crystal 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)	Category 3
		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	Category 2A
	Respiratory sensitization	Classification not possible
	Skin sensitization	Classification not possible
	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)	Category 3
	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	Skull and crossbones	Health Hazard
		
Signal word	Danger	
Dangerous goods hazard information	Toxic if swallowed. Causes serious eye irritation. May cause respiratory irritation.	
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. Wear Protective glovess/protective clothing/eye protection/face protection.	

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【First-aid measures】	IF SWALLOWED: Immediately call poison center or doctor/physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Call poison center or doctor/physician. Get medical advice/attention if you feel unwell. Specific treatment . Rinse mouth. If eye irritation persists: Get medical advice/attention.
【Storage】	Store locked up.
【Disposal】	Dispose of contents/container in accordance with national regulations.
【Other hazards】	-

SECTION 3 Composition/information on ingredients

Substance/Mixture	Substance
Chemical name	<i>Barium fluoride</i>
Chemical formula	<i>BaF2</i>
Concentration or concentration range	99.9%<
CAS No.	7787-32-8
TSCA Inventory	<i>Barium fluoride (BaF2)</i>
EINECS number	232-108-0
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

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SECTION 5 Firefighting measures

Suitable extinguishing media	It use a water mist, dry chemicals, fire foam, carbon dioxide depending on the neighboring situation and the situation of the fire.
Unsuitable extinguishing media	Because a fire might spread through the outskirts, It avoid direct stick irrigation.
Specific hazards	In the case of fires, a toxic decomposition product may occur.
Specific extinguishing methods	It perform the fire fighting from windward. Restrict access to the area around the fire location to persons other than those involved with the fire. It move a container from the fire area if not dangerous.
Special protective equipment for firefighters	On the occasion of fire extinguishing work, It wear appropriate personal protective equipment and rescue suit.

SECTION 6 Accidental release measures

Personal precautions, protective equipment, and emergency procedures	It prohibit 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 avoid an outflow to the environmental average of the product to have possibilities to influence neighboring environment.
Methods and material for containment and cleaning up	It collects it in sky containers as if sweeping the scattered thing, and gathering you, or being able to absorb it with a vacuum sweeper, and from scattering not pitching a camp. The prohibition of handling and eating and drinking in neighboring of the storage area. It prevents the inflow to a drainage, a sewer, a basement or the closedown place.
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	It prevents you from producing dust.
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	It avoids direct rays of the sun and keeps it in the cool and dark space. Store in a well-ventilated place. Keep container tightly closed. Store locked up.

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Safety packaging material It use the container which It can seal up without damage and the leak.

SECTION 8 Exposure controls/personal protection

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Permissible concentration

ACGIH

Unestablished

Appropriate engineering controls

In the work shop which dust produces, It use 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	Plate, lens, disk
Colour	Transparent or white
Odour	None

BaF2

Melting point/freezing point

*1,353°C (Merck (15th, 2013))*Boiling point or initial boiling point
and boiling range*2,260°C (Merck (15th, 2013))*

Flammability

*No data available*Upper/lower flammability or
explosive limits*No data available*

Flash point

No data available

Auto-ignition temperature

Nonflammability (GESTIS (2016))

Decomposition temperature

No data available

pH

No data available

Kinematic viscosity

No data available

Solubility

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Water	1.586 g/L (10°C); 1.607 g/L (20°C); 1.620 g/L (30°C) (Merck (15th, 2013))
Other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Vapour pressure	No data available
Density and/or relative density (Density)	4.83 (Merck (15th, 2013))
Relative vapor density	No data available
Particle characteristics	No data available
Other information	No data available

SECTION 10 Stability and reactivity

BaF2

Reactivity	It is stable under the normal handling condition.
Chemical stability	It is stable under the normal handling condition.
Possibility of hazardous reactions	A dangerous adverse effect is not caused under the normal handling condition.
Conditions to avoid	It avoid direct rays of the sun and keep it in the cool and dark space.
Incompatible materials	Oxidizer, reducing agent
Hazardous decomposition products	In the case of fires, a toxic decomposition product may occur.

SECTION 11 Toxicological information

BaF2

Acute toxicity(oral)	LD50 value of 250mg/kg oral study in rats (EHC 107, 1990)
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
Serious eye damage/irritation	There are no data for this substance. However, based on a description that the fluorides cause irritation of the eyes (ACGIH (7th, 2001)), it was classified in Category 2.
Respiratory or skin sensitization	No data available
Germ cell mutagenicity	No data available

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Carcinogenicity

There is no carcinogenicity information on this substance or on the fluorides. However, as described in the same hazard class on the GHS classification of barium (CAS RN 7440-39-3), the EPA classified barium and its compounds as Group D or NL (IRIS (1998)) and ACGIH classified barium and its soluble compounds as A4 (ACGIH (7th, 2001)) based on results from animal tests using barium chloride dihydrate. Therefore, this substance was also classified as "Classification not possible" based on these classifications by other organizations.

Reproductive toxicity

Classification not possible due to lack of data. Besides, there is a description (EHC 107 (1990)) that in a test in which the substance was orally administered to pregnant rats on the first days of gestation, decreases in the survival of 5-day-old embryos and in newborn birth weights, and increase in mortality rate of newborn were observed, however, no incidence of malformation was observed.

Specific target organ toxicity(single exposure)

In ACGIH (7th, 2001), there is a description that fluorides cause irritation to the respiratory tract. Therefore, this substance was classified in Category 3 (respiratory tract irritation).

Specific target organ toxicity(repeated exposure)

There is no information on this substance itself. However, it is said that the toxicity of barium and barium compounds depends largely on the solubility, and that the toxicity is an inhibitory action of potassium channel by barium ions (ATSDR (2007)). The barium ions and the soluble compounds of barium (notably barium chloride, barium nitrate, barium hydroxide) are toxic to humans. Although barium carbonate is relatively insoluble in water, it is toxic to humans because it is soluble in the gastrointestinal tract. The insoluble compounds of barium (notably barium sulfate) are inefficient sources of the barium ion and are therefore generally nontoxic to humans (ATSDR (2007)). Therefore, this substance is thought to exhibit similar target organs as those exhibited by soluble barium.

It is reported that incidences of hypertension, heart disease, and stroke increased in a population of neighborhood who ingested drinking water containing water soluble barium such as barium chloride, and that an increase in mortality due to heart diseases such as vascular disorder and arteriosclerosis was observed in other similar groups (ATSDR (2007)). For the inhalation route, a high rate of elevated blood pressure was reported among workers exposed to soluble barium (mean 1.07 g/m³) through work that involved blending and grinding several grades of barium at a mineral processing facility (CICAD 33 (2001)). It is written that among the effects of soluble barium in humans, ingestion of high levels of soluble barium compounds may cause the following acute effects: gastroenteritis (vomiting, diarrhoea, abdominal pain), hypopotassemia, hypertension, cardiac arrhythmias, and skeletal muscle paralysis (CICAD 33 (2001)).

Additionally, there are only several reported cases that renal failure and renal insufficiency occurred as acute barium poisoning. However, as for experimental animals, in 13-week or 2-year studies of barium dichloride or its dihydrate administered to rats or mice in drinking water, deaths attributed to nephropathy were observed at doses corresponding to Category 2 or higher (converted guidance value as barium dichloride: 271-803 mg/kg/day). It is described that the kidneys are the most sensitive target organ in the experimental animals (ATSDR (2007)). Therefore, the kidneys are thought to be one of the target organs in humans as well.

Additionally, in the "Fluorides" of ACGIH, it is reported that bone lesions related to fluorosis caused by occupational exposure to inorganic fluorides (ACGIH (7th, 2001)).

From the above, effects of soluble barium compounds including this substance were thought to have a high probability of occurring in the cardiovascular system, nervous system, muscular system, and kidneys. In addition, as a fluoride, this substance may have effects on the bones. Therefore, the substance was classified in Category 1 (cardiovascular system, nervous system, muscular system, kidney, bone).

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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
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

BaF2

International regulation

UN number	1564
UN proper shipping name	BARIUM COMPOUND, N.O.S.
UN classification	6.1
Transport hazard class	Not applicable
Packing group	III
Hazardous to the aquatic environment	No data available
Maritime transport in bulk according to IMO instruments	No data available
Japanese laws and regulations	Refer to "15. Regulatory information."

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Special precautions for users

*The Fire Services Act, Deleterious Substance Control Law, an object of the yellow card maintenance by the rule of the explosives control method.
When transporting, protect from direct sunlight and take on cargo without breakage of container, corrosion and leakage.
Do not stack heavy good thereupon.*

Special Provisions

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SECTION 15 Regulatory information (Japan)

BaF2

Occupational Safety and Health Law

Not applicable

PRTR Law

Not applicable

Poisonous and Deleterious Substances control Law

There is it in the case of an application or an application

Labor Standards Act

There is it in the case of an application or an application

Chemical substances control Law

Not applicable

Fire fighting Law

There is it in the case of an application or an application

Air Pollution Control Act

Not applicable

Water Pollution Prevention Act

There is it in the case of an application or an application

Water Supply Act

There is it in the case of an application or an application

Sewerage Act

There is it in the case of an application or an application

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.

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)