

Safety Data Sheet (SDS)

Date of Issue: 1st September, 2005

Date Revised: 1st April, 2021

1. Identification of the Substance/Preparation and of the Company

Product

Chemical Name: Ceramics, Ceramic Tools, Coated Ceramics, and Coated Ceramic Tools

Supplier Information

Company Name: NGK SPARK PLUG CO., LTD.

Contact Department: Machining Technology Company

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Recommended Use and Restrictions on Use

Cutting tools mainly for metallic materials

2. Hazard Identification

Important Hazards and Effects

- Danger:
- Ceramics is nonflammable in solid form and there is no risk of fire. However, dusts resulting from cutting and grinding may be pyrophoric or explosive.
 - Not reported on flash point, ignition point, explosive limits, etc.
- Hazard:
- If dusts resulting from cutting and grinding are on skin or in eyes, irritation may occur.
- Environmental Effects:
- Not reported on Ceramics

GHS Classification

Not applicable

GHS Label Elements

Not applicable

3. Composition/Information on Ingredients

- Ceramics may be coated with the following substances.
Al₂O₃, (Al,Ti)N, CrN, Ti(B,C,N), TiC, (Ti,Zr)N
- Distinction between Substance and Mixture : Mixture (alloy)
- Ingredients and Concentration or Concentration Range (Composition)

Ingredient	Chemical Formula	CAS No	Composition mass%
Aluminum Oxide	Al ₂ O ₃	1344-28-1	0-100
Zirconium Oxide	ZrO ₂	1314-23-4	0-15
Ytterbium Oxide	Yb ₂ O ₃	1314-37-0	0-5
Yttrium Oxide	Y ₂ O ₃	1314-36-9	0-15
Magnesium Oxide	MgO	1309-48-4	0-5
Chromium Oxide	Cr ₂ O ₃	1308-38-9	0-1
Dysprosium Oxide	Dy ₂ O ₃	1308-87-8	0-1
Cerium Oxide	CeO ₂	1306-38-3	0-5
Lanthanum Oxide	La ₂ O ₃	1312-81-8	0-5
Yttrium Aluminum Oxide	Y ₂ Al ₅ O ₃		0-5
Silicon Carbide	SiC	409-21-2	0-40
Zirconium Carbide	ZrC	12070-14-3	0-10
Aluminum Nitride	AlN	34304-00-5	0-20
Silicon Nitride	Si ₃ N ₄	12033-89-5	0-100
Titanium Nitride	TiN	25583-20-4	0-30
Cobalt	Co	7440-48-4	0-0.5
Nickel	Ni	7440-02-0	0-0.5
Magnesium Compound			0-1
Tungsten Carbide	WC	12070-12-1	0-85
Tantalum Carbide	TaC	12070-06-3	0-20
Titanium Carbide	TiC	12070-08-5	0-70

4. First-Aid Measures

If Inhaled

- If the high concentration of dust from grinding scraps is inhaled or respiratory symptoms (coughs, gasping, shortness of breath, etc.) are experienced, evacuate and isolate the workplace. If breathing difficulties occur, administer oxygen inhalation. If breathing has stopped, immediately administer artificial respiration and get medical advice/attention.
- If irritation or rash persists, get medical advice and attention.

If on Skin

- If dust from grinding scraps is contacted with skin, take off contaminated clothing and rinse the affected area with soapy water thoroughly. If irritation or rash persists, get medical advice/attention.

If in Eyes

- If dust from grinding scraps is in eyes, immediately wash away with clean water. If irritation persists, get medical advice/attention.

If Swallowed

- If a large amount of dust is swallowed, get medical advice/attention after ingesting plenty of water to dilute.

5. Fire-Fighting Measures

Extinguishing Media

- To extinguish the fire of dusts resulting from grinding, use dry sand, dry dolomite, ABC type (general, oil, electric fire) powder extinguishers or water (no water allowed for the dust containing cut powders of light metal such as magnesium and aluminum).

Unusual Fire and Explosion

- Dusts resulting from grinding are very fine and under the specific conditions in which the dusts are mixed with grinding oil with low flash point, it is possible to become pyrophoric. If dusts under very flammable conditions are dispersed in the air, it is possible to explode. In such cases, look to your own safety first and then take necessary fire-fighting measures.

Special Protective Actions for Fire-Fighters

- In fighting a fire, wear a dust-proof respirator or respiratory protective equipment.

6. Accidental Release Measures

Personal Precautions

- It is recommended that someone who cleans grinding scraps or dusts should wear clothing and respiratory protective equipment to minimize exposure.

Environmental Precautions

- Dispose of dusts as industrial wastes and prevent release in water systems.

Cleaning Up Methods

- If there are dusts from resulting from grinding and mechanical processing, isolate the area and remove with a cleaner equipped with a filter which can take up fine particles very efficiently. If appropriate removing methods are not available, sweep with water sprayers or wet mops.

7. Handling and Storage

Handling

- Ceramics is stable and has little effect on health. However prolonged or repeated exposure to the dust or grinding liquid containing cobalt or nickel may cause rough skin.
- In grinding or mechanical processes, provide local exhaust ventilation and use personal protective equipment to minimize exposure to human body, due to the possibilities of the disperse of dust containing cobalt or nickel. Do the same way for grinding sludge.
- Wash hands thoroughly before eating, drinking, and smoking. Do not eat, drink, and smoke in the handling area.
- Regular physical checkups are recommended.

Storage

- Avoid sudden changes of temperature and high humidity for storage.

8. Exposure Controls/Personal Protection

Provide local exhaust ventilation so that dusts in the air may not exceed the exposure limits in the following table. If it is possible that a concentration may exceed the permissible level, use a dust-proof respirator or respiratory protection.

Permissible Concentration in Working Environment

Ingredient	Chemical Formula	OSHA* PEL* mg/m ³ (Metal Dust Concentration)	ACGIH* TLV* mg/m ³ (Metal Dust Concentration)	Japan Society for Occupational Health Exposure Limit mg/m ³
Aluminum Oxide	Al ₂ O ₃	5 (as Al)	10	N/A
Zirconium Oxide	ZrO ₂	5 (as Zr)	5 (as Zr)	5 (as Zr)
Ytterbium Oxide	Yb ₂ O ₃	N/A	N/A	N/A
Yttrium Oxide	Y ₂ O ₃	1 (as Y)	1 (as Y)	N/A
Magnesium Oxide	MgO	15	10	N/A
Chromium Oxide	Cr ₂ O ₃	0.5 (as Cr)	0.5 (as Cr)	0.5 (as Cr)
Dysprosium Oxide	Dy ₂ O ₃	N/A	N/A	N/A
Cerium Oxide	CeO ₂	N/A	N/A	N/A
Lanthanum Oxide	La ₂ O ₃	N/A	N/A	N/A
Yttrium Aluminum Oxide	Y ₂ Al ₅ O ₃	1 (as Y)	1 (as Y)	N/A
Silicon Carbide	SiC	5	3	N/A
Zirconium Carbide	ZrC	15	5	N/A
Aluminum Nitride	AlN	5 (as Al)	1 (as Al)	N/A
Silicon Nitride	Si ₃ N ₄	N/A	N/A	N/A
Titanium Nitride	TiN	N/A	N/A	N/A
Cobalt	Co	0.1	0.02	0.05
Nickel	Ni	1	1.5	1
Magnesium Compound		N/A	N/A	N/A
Tungsten Carbide	WC	N/A	5 (as W)	N/A
Tantalum Carbide	TaC	5 (as Ta)	N/A	N/A
Titanium Carbide	TiC	N/A	N/A	N/A

*OSHA : Occupational Safety & Health Administration U.S. Department

*PEL : Permissible Exposure Limit

*ACGIH : American Conference of Governmental Industrial Hygienists Inc.

*TLV : Threshold Limit Value

*N/A : Not Applicable

Protective Equipment

- Respiratory Protection: Dust-proof respirators and respiratory protective equipment are recommended.
- Hand Protection: Protective gloves for dusts are recommended.
- Eye Protection: Protective glasses for dusts are recommended.
- Skin/Body Protection: Avoid direct skin contact.
Clean up deposited dust on clothing, rags, etc. by washing or absorbing with suitable filters but not by whisking off.
Change the contaminated clothing into clean one.
Local exhaust ventilation is recommended.

9. Physical and Chemical Properties

Appearance:	White, Gray, Pink, Green, Brown, Black or Gold solid
Odor:	Odorless
pH:	No data available
Melting Point:	
Boiling Point:	No data available
Flash Point:	No data available
Vapor Pressure:	No data available
Specific Gravity:	3.0 – 10.0
Solubility:	Insoluble

10. Stability and Reactivity

Reactivity

- Can be a possible cause to produce harmful gases in contact with chemical such as acid.

Chemical Stability

- This product is in solid form and therefore chemically stable as it is and not explosive, flammable, combustible, pyrophoric, water-reactive, and oxidizing in normal environment.

Possibility of Hazardous Reactions

- Not applicable

Conditions to Avoid

- Not reported on Ceramics

Incompatible Materials

- Not reported on Ceramics

Hazardous Decomposition Products

- None

11. Toxicological Information

Acute Toxicity

Data on this product: No data available

Skin Corrosion/Irritation

Data on this product: No data available

Serious Eye Damage/Eye Irritation

Data on this product: No data available

Respiratory or Skin Sensitization

Data on this product: No data available

Germ Cell Mutagenicity

Data on this product: No data available

Carcinogenicity

Data on this product: No data available

Reproductive Toxicity

Data on this product: No data available

Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)

Data on this product: No data available

Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)

Data on this product: No data available

Aspiration Hazard

Data on this product: No data available

12. Ecological Information

Mobility

- Not reported on Ceramics

Persistence

- Not reported on Ceramics

Bioaccumulative Potential

- Not reported on Ceramics

Environmental Effects

- Not reported on Ceramics

13. Disposal Considerations

Disposal Method

- Tungsten carbide, cobalt, nickel are rare metal. It is desirable to collect and recycle them.
- For disposal, conform to the applicable laws regarding industrial wastes such as 'Waste Disposal and Public Cleansing Law' and relevant local by laws.

14. Transport Information

UN Number: Not applicable

UN Hazard Class: Not applicable

Marine Pollutant: Not applicable

15. Regulatory Information

As this product is an article, laws and regulations prescribed for chemical substances are not applied.

16. Other Information

Other Hazardous Information

The following attention should be paid for dusts resulting from cutting and grinding Ceramics.

- Dusts resulting from cutting and grinding irritate the mucous membranes of the nose, mouth, throat, and eyes; they also irritate the respiratory organs and lungs. Symptoms include allergic skin rash, and coughs, asthma, shortness of breath, chest pressure and tightness in the chest.
- If a large amount of dust containing cobalt is inhaled, blood, heart, thyroid gland, and spleen disorders may result. (References 1)
- Ingestion of the dust containing high levels of aluminum oxide may cause irritation of the eyes and upper airway. (References: 3)
- Magnesium oxide irritates the eyes and noses. Ingestion of fume may cause metal fume fever (References 3)
- Zirconium oxide may cause dizziness, the increase in perspiration and the deterioration of capillary tube resistance and the hyperfunction of sensation for pain and temperature, the granuloma of the skin, light irritative symptom of respiratory organs.(Reference: 4)
- It is reported that repeated or prolonged contact with zirconium oxide, cobalt, nickel, or chromium may affect skin, respiratory organs, heart, etc. (References 2 – 5)
- Repeated or long-term inhalation or exposure of aluminum oxide may affect central nerve system. (Reference: 3)

Although it is not reported that Ceramics is carcinogenic, the following is reported on raw material powders and metal ingredients.

Metallic cobalt powders with tungsten carbide	IARC	2A: Probably carcinogenic to humans. (References 6)
Cobalt metal	ACGIH	A3: Confirmed animal carcinogen with unknown relevance to humans.
	IARC	2B: Possibly carcinogenic to humans.
	Japan Society for Occupational Health	2B: The substance has been determined to be possibly carcinogenic to humans (with relatively insufficient evidence).
Nickel metal	ACGIH	A5: Not suspected as a human carcinogen.
	IARC	2B: Possibly carcinogenic to humans.
	Japan Society for Occupational Health	2B: The substance has been determined to be possibly carcinogenic to humans (with relatively insufficient evidence).
Chromium metal	IARC	3: Not classifiable as to its carcinogenicity to humans.

*ACGIH : American Conference of Governmental Industrial Hygienists Inc.

*IARC : International Agency for Research on Cancer

Although Ceramics is unknown about environmental effects, the following is reported on metal ingredients.

- Cobalt and chromium may be harmful to the environment. Special attention should be paid for the effect on aquatic life.

Disclaimer

The contents of this MSDS are based on material and information available as of today and may be revised due to knowledge newly obtained. The values of concentration, physical/chemical properties are not guaranteed. In addition, the precautions described herein apply only to normal uses, and thus safety cannot be guaranteed.

References

- (1) Food & Drug Research Laboratories, study No.8005B (4.11.84).
- (2) T. Shirakawa et al., Chest. 95, 29 (1989).
- (3) International Chemical Safety Cards (cobalt, chromium, nickel).
- (4) The Guide to Chemical Hazards (edited by Japan Industrial Safety & Health Association)
- (5) A. O. Bech et al., Brit. J. Ind., 19, 239 (1962).
- (6) IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, vol.86 (2006).

Revision record

	Date	Contents
Rev.8	1 st April, 2021	The change of Contact Department Name etc.