

Material Safety Data Sheet

acc. to OSHA and ANSI

1 Identification of substance:

- **Product details:**
- **Trade name:** Cobalt powder
- **Stock number:** 0276JY
- **Manufacturer/Supplier:**
Nanostructured & Amorphous Materials, Inc.
16840 Clay Road, Suite #113
Houston, TX 77084, USA

2 Composition/Data on components:

- **Chemical characterization:**
Description: (CAS#)
Cobalt (CAS# 7440-48-4): 100%
- **Identification number(s):**
- **EINECS Number:** 231-158-0
- **EU Number:** 027-001-00-9

3 Hazards identification

- **Hazard description:**
Xn Harmful
F Highly flammable
- **Information pertaining to particular dangers for man and environment**
R 11 Highly flammable.
R 42/43 May cause sensitization by inhalation and skin contact.
R 53 May cause long-term adverse effects in the aquatic

environment.

- **Classification system**
- **HMIS ratings (scale 0-4)**

(Hazardous Materials Identification System)

Health (acute effects) = 1

Flammability = 2

Reactivity = 1

4 First aid measures

- **After inhalation**
Supply fresh air and to be sure call for a doctor.
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
- **After skin contact**
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.
- **After eye contact**
Rinse opened eye for several minutes under running water.
Then consult a doctor.
- **After swallowing** Seek immediate medical advice.
- **Information for doctor**
- **The following symptoms may occur:**
Nausea
Gastric or intestinal disorders.

5 Fire fighting measures

- **Suitable extinguishing agents**
Special powder for metal fires. Do not use water.
- **For safety reasons unsuitable extinguishing agents** Water
- **Special hazards caused by the material, its products of combustion or resulting gases:**
In case of fire, the following can be released:
Toxic metal oxide fume

- **Protective equipment:**
Wear self-contained respirator.
Wear fully protective impervious suit.

6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
- **Measures for environmental protection:**
Do not allow material to be released to the environment without proper governmental permits.
- **Measures for cleaning/collecting:** Pick up mechanically.
- **Additional information:**
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

- **Handling**
- **Information for safe handling:**
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Prevent formation of dust.
- **Information about protection against explosions and fires:**
Dust can combine with air to form an explosive mixture.
- **Storage**
- **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
- **Information about storage in one common storage facility:**
Do not store together with oxidizing and acidic materials.
- **Further information about storage conditions:**
Store under dry inert gas.
Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Cobalt, elemental & inorganic compounds, as Co

	mg/m ³
ACGIH TLV	0.02; Confirmed animal carcinogen
Austria	Carcinogen
Belgium TWA	0.05
Denmark TWA	0.05
Finland TWA	0.05 (skin)
Germany	Carcinogen
Hungary TWA	0.1; 0.2-STEL
Japan OEL	0.05; 2B-Carcinogen
Korea TLV	0.02; Confirmed animal carcinogen
Netherlands MAC-TGG	0.05
Norway TWA	0.05
Poland TWA	0.05; 0.2-STEL
Russia	0.5-STEL
Sweden NGV	0.05
Switzerland MAK-W	0.1; Carcinogen
United Kingdom TWA	0.1
USA PEL	0.1 (dust and fume)

- **Additional information:** No data
- **Personal protective equipment**
- **General protective and hygienic measures**
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
- **Breathing equipment:**
Use suitable respirator when high concentrations are

present.

- **Protection of hands:**
Impervious gloves
Check protective gloves prior to each use for their proper condition.
- **Material of gloves**
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
- **Eye protection:** Safety glasses
- **Body protection:** Protective work clothing.

9 Physical and chemical properties:

- **General Information**

- **Form:** Powder
- **Color:** Black
- **Odor:** Odorless

- | | <u>Value/Range</u> | <u>Unit</u> | <u>Method</u> |
|--|--------------------|-------------|---------------|
|--|--------------------|-------------|---------------|

- **Change in condition**

- **Melting point/Melting range:** 1495 ° C
- **Boiling point/Boiling range:** 2900 ° C
- **Sublimation temperature / start:** Not determined
- **Flash point:** Not applicable
- **Flammability (solid, gaseous)** Highly flammable.
- **Ignition temperature:** Not determined
- **Decomposition temperature:** Not determined
- **Explosion limits:**
- **Lower:** Not determined

- **Upper:** Not determined
- **Vapor pressure:** Not determined
- **Density:** at 20 ° C 8.92 g/cm³
- **Solubility in / Miscibility with**
- **Water:** Insoluble

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:**
Decomposition will not occur if used and stored according to specifications.
- **Materials to be avoided:**
Acids
Oxidizing agents
Air
Interhalogens
- **Dangerous reactions** Powder: may cause fire.
- **Dangerous products of decomposition:** Toxic metal oxide fume

11 Toxicological information

- **Acute toxicity:**
LD/LC50 values that are relevant for classification:

Oral: LD50: 6170 mg/kg (rat)
LDLo: 750 mg/kg (rbt)
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:**
Sensitization possible through inhalation.
Sensitization possible through skin contact.
- **Other information (about experimental toxicology):**
Tumorigenic effects have been observed on tests with laboratory animals.
Mutagenic effects have been observed on tests with human

and/or animal DNA cells.

- **Subacute to chronic toxicity:**

Cobalt is an experimental neoplastigen and tumorigen. It is an experimental carcinogen of the connective tissue and lungs. Cobalt metal and inorganic compounds are classified as an animal carcinogen by the ACGIH. Ingestion may cause burning in the mouth, esophagus, and stomach. Inhalation of dusts and fumes may cause irritation of the respiratory tract and labored breathing and coughing. Sensitization, nausea, flushing of the face and ringing in the ears is also possible. Chronic ingestion may result in pericardial effusion, polycardial effusion, polycythemia, cardiac failure, vomiting, convulsions and thyroid enlargement.

- **Subacute to chronic toxicity:**

The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:

Behavioral - somnolence (general depressed activity).

Behavioral - ataxia.

Gastrointestinal - hypermotility, diarrhea.

Gastrointestinal - tumors.

Vascular - regional or general arteriolar or venous dilation.

Liver - other changes.

Blood - other changes.

Lungs, Thorax, or Respiration - other changes.

Lungs, Thorax, or Respiration - changes in pulmonary vascular resistance.

Kidney, Ureter, Bladder - changes in tubules (including acute renal failure, acute tubular necrosis).

Tumorigenic - neoplastic by RTECS criteria.

Tumorigenic - tumors at site of application.

Tumorigenic - equivocal tumorigenic agent by RTECS criteria.

Musculoskeletal - tumors.

- **Additional toxicological information:**

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.

ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by

mechanism(s) not considered relevant to worker exposure.
Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans. Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

12 Ecological information:

- **General notes:**

Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations

- **Product:**

- **Recommendation**

Consult state, local or national regulations to ensure proper disposal.

- **Uncleaned packagings:**

- **Recommendation:**

Disposal must be made according to official regulations.

14 Transport information

- **DOT regulations:**

- **Hazard class:** 4.1

- **Identification number:** UN3089

- **Packing group:** II

- **Proper shipping name (technical name):**

Metal powders, flammable, n.o.s.
(cobalt)

- **Land transport ADR/RID (cross-border)**

- **ADR/RID class:** 4.1 Flammable solids

- **Item:** 13b

- **Danger code (Kemler):** 40

- **UN-Number:** 3089
- **Description of goods:** Metal powders, flammable, n.o.s. (cobalt)
- **Maritime transport IMDG:**
- **IMDG Class:** 4.1
- **UN Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s. (cobalt)
- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 4.1
- **UN/ID Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s. (cobalt)

15 Regulations

- **Product related hazard informations:**
- **Hazard symbols:**
Xn Harmful F Highly flammable
- **Risk phrases:**
11 Highly flammable.
42/43 May cause sensitization by inhalation and skin contact.
53 May cause long-term adverse effects in the aquatic environment.
- **Safety phrases:**
22 Do not breathe dust.
24 Avoid contact with skin.
37 Wear suitable gloves.
61 Avoid release to the environment. Refer to special

instructions/Safety data sheets

- **National regulations**

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory.

This product contains a chemical known to the state of California to cause cancer or reproductive toxicity.

- **Information about limitation of use:**

For use only by technically qualified individuals.

This product contains cobalt and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

16 Other information:

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Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.