Cobalt(II) Oxide	Pricing >
Cobalt(II) Oxide Nanoparticles / Nanopowder	Pricing >
Cobalt(II) Oxide Sputtering Target	Pricing >

Linear Formula	CoO
Pubchem CID	14786
MDL Number	MFCD00016031
EC No.	215-154-6
IUPAC Name	Oxocobalt
Beilstein/Reaxys No.	N/A
SMILES	[Co]=O
Inchl Identifier	InChI=1S/Co.O
Inchl Key	IVMYJDGYRUAWML-UHFFFAOYSA-N

Signal Word	Warning
Hazard Statements	H302-H317-H410
Hazard Codes	Xn, N
Precautionary Statements	P201-P202-P260-P264-P270-P271-P272-P280-P281-P284-P285-P301+P310-P302+P352-P304+P340-P308+P313-P310-P330-P333+P313-P363-P501
Risk Codes	22-43-50/53
Safety Statements	24-37-60-61
RTECS Number	GG2800000
Transport Information	UN 3288 6.1/PG III
WGK Germany	3
GHS Pictograms	GHS07 Exclamation Point  GHS08 Health Hazard 

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SAFETY DATA SHEET

Date Accessed: 03/28/2024
Date Revised: 01/15/2022

SECTION 1. IDENTIFICATION

Product Identifiers: All applicable American Elements product codes for CAS #1307-96-6

Relevant identified uses of the substance:
Scientific research and development

Supplier details:
American Elements
10884 Weyburn Ave.
Los Angeles, CA 90024

Tel: +1 310-208-0551
Fax: +1 310-208-0351

Emergency telephone number:
Domestic, North America +1 800-424-9300
International +1 703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)
GHS08 Health hazard
Carc. 2 H351 Suspected of causing cancer.
GHS07
Acute Tox. 4 H302 Harmful if swallowed.
Skin Sens. 1 H317 May cause an allergic skin reaction.
Hazards not otherwise classified
No data available
GHS label elements
GHS label elements, including precautionary statements
Hazard pictograms

GHS07
GHS08
Signal word
Warning
Hazard-determining components of labeling:
Cobalt(II) oxide
Cobalt(II,III) oxide
Hazard statements
H302 Harmful if swallowed.
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.
Precautionary statements
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.
P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/.../if you feel unwell.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
WHMIS classification
D1B - Toxic material causing immediate and serious toxic effects
D2B - Toxic material causing other toxic effects

Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)
Health (acute effects) = 2
Flammability = 0
Physical Hazard = 1
Other hazards
Results of PBT and vPvB assessment
PBT:
N/A
vPvB:
N/A

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization: Mixtures
Dangerous components:
1307-96-6 Cobalt(II) oxide
Acute Tox. 4, H302; Skin Sens. 1, H317
90.0%
1308-06-1 Cobalt(II,III) oxide
Carc. 2, H351; Skin Sens. 1, H317
10.0%
Additional information
None known.

SECTION 4. FIRST AID MEASURES

Description of first aid measures
If inhaled:
Supply patient with fresh air. If not breathing, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.
In case of skin contact:
Immediately wash with soap and water; rinse thoroughly.
Seek immediate medical advice.
In case of eye contact:
Rinse opened eye for several minutes under running water. Consult a physician.
If swallowed:
Seek medical treatment.
Information for doctor
Most important symptoms and effects, both acute and delayed
No data available
Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5. FIREFIGHTING MEASURES

Extinguishing media
Suitable extinguishing agents
Product is not flammable. Use fire-fighting measures that suit the surrounding fire.
Special hazards arising from the substance or mixture
If this product is involved in a fire, the following can be released:
Metal oxide fume
Advice for firefighters
Protective equipment:
Wear self-contained respirator.
Wear fully protective impervious suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Environmental precautions:
Do not allow material to be released to the environment without official permits.
Methods and materials for containment and cleanup:
Dispose of contaminated material as waste according to section 13.
Prevention of secondary hazards:
No special measures required.
Reference to other sections
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7. HANDLING AND STORAGE

Handling
Precautions for safe handling
Handle under dry protective gas.
Keep container tightly sealed.
Store in cool, dry place in tightly closed containers.
Ensure good ventilation at the workplace.
Information about protection against explosions and fires:
The product is not flammable
Conditions for safe storage, including any incompatibilities

Requirements to be met by storerooms and receptacles:
No special requirements.
Information about storage in one common storage facility:
Store away from oxidizing agents.
Store away from air.
Further information about storage conditions:
Store under dry inert gas.
This product is air sensitive.
Keep container tightly sealed.
Store in cool, dry conditions in well-sealed containers.
Specific end use(s)
No data available

SECTION 8. EXPOSURE CONTROLS/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.
Control parameters
Components with limit values that require monitoring at the workplace:
1307-96-6 Cobalt(II) oxide (90.0%)

PEL (USA) Long-term value: 0.1* mg/m^3
as Co; *for metal dust and fume

REL (USA) Long-term value: 0.05 mg/m^3
as Co; metal dust & fume

TLV (USA) Long-term value: 0.02 mg/m^3
as Co, BEI
1308-06-1 Cobalt(II,III) oxide (10.0%)

PEL (USA) Long-term value: 0.1* mg/m^3
as Co; *for metal dust and fume

REL (USA) Long-term value: 0.05 mg/m^3
as Co; metal dust & fume

TLV (USA) Long-term value: 0.02 mg/m^3
as Co, BEI
Ingredients with biological limit values:
1307-96-6 Cobalt(II) oxide (90.0%)
BEI (USA) 15 µg/L
Medium: urine
Time: end of shift at end of workweek
Parameter: Cobalt (background)
1 µg/L
Medium: urine
Time: end of shift at end of workweek
Parameter: Cobalt (background, semi-quantitative)
1308-06-1 Cobalt(II,III) oxide (10.0%)

BEI (USA) 15 µg/L
Medium: urine
Time: end of shift at end of workweek
Parameter: Cobalt (background)
1 µg/L
Medium: urine
Time: end of shift at end of workweek
Parameter: Cobalt (background, semi-quantitative)
Additional information:
No data
Exposure controls
Personal protective equipment
Follow typical protective and hygienic practices for handling chemicals.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Maintain an ergonomically appropriate working environment.
Breathing equipment:
Use suitable respirator when high concentrations are present.
Protection of hands:
Impervious gloves
Inspect gloves prior to use.
Suitability of gloves should be determined both by material and quality, the latter of which may vary by manufacturer.
Penetration time of glove material (in minutes)
No data available
Eye protection:
Safety glasses
Body protection:
Protective work clothing

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties
Appearance:
Form: Various forms (powder/flake/crystalline/beads, etc.)
Color: Green-brown
Odor: No data available
Odor threshold: No data available.
pH: N/A
Melting point/Melting range: 1935 °C (3515 °F)
Boiling point/Boiling range: No data available
Sublimation temperature / start: No data available
Flammability (solid, gas): No data available.
Ignition temperature: No data available
Decomposition temperature: No data available

Autoignition: Product is not selfigniting.
Danger of explosion: No data available.
Explosion limits:
Lower: No data available
Upper: No data available
Vapor pressure: N/A

Density at 20 °C (68 °F): 6.45 g/cm^3 (53.825 lbs/gal)
Relative density: No data available.
Vapor density: N/A
Evaporation rate: N/A
Solubility in Water (H_2O): Insoluble

Partition coefficient (n-octanol/water): No data available.
Viscosity:
Dynamic: N/A
Kinematic: N/A
Solvent content:
Organic solvents: 0.0 %
Solids content: 100.0 %
Other information: No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity
No data available
Chemical stability
Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided:
Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions
No dangerous reactions known
Conditions to avoid
No data available
Incompatible materials:
Air
Oxidizing agents
Hazardous decomposition products:
Metal oxide fume

SECTION 11. TOXICOLOGICAL INFORMATION

Information on toxicological effects
Acute toxicity:
Harmful if swallowed.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for components in this product.
LD/LC50 values that are relevant for classification:
1307-96-6 Cobalt(II) oxide

Oral LD50 202 mg/kg (rat)
Skin irritation or corrosion:
Irritating effect.
Eye irritation or corrosion:
May cause irritation
Sensitization:
May cause an allergic skin reaction.
Germ cell mutagenicity:
No effects known.
Carcinogenicity:
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 epidemologic 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.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.
Reproductive toxicity:
No effects known.
Specific target organ system toxicity - repeated exposure:
No effects known.
Specific target organ system toxicity - single exposure:
No effects known.
Aspiration hazard:
No effects known.
Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
The product shows the following dangers according to internally approved calculation methods for preparations:
Harmful
Irritant

SECTION 12. ECOLOGICAL INFORMATION

Toxicity
Aquatic toxicity:

No data available
Persistence and degradability
No data available
Bioaccumulative potential
No data available
Mobility in soil
No data available
Ecotoxical effects:
Remark:
Very toxic for aquatic organisms
Additional ecological information:
Do not allow material to be released to the environment without official permits.
Do not allow product to reach groundwater, water courses, or sewage systems, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.
May cause long lasting harmful effects to aquatic life.
Avoid transfer into the environment.
Very toxic for aquatic organisms
Results of PBT and vPvB assessment
PBT:
N/A
vPvB:
N/A
Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Recommendation
Consult official regulations to ensure proper disposal.
Uncleaned packagings:
Recommendation:
Disposal must be made according to official regulations.

SECTION 14. TRANSPORT INFORMATION

UN-Number
DOT, IMDG, IATA
UN 3288
UN proper shipping name
DOT
Toxic solids, inorganic, n.o.s. (Cobalt(II) oxide)
IMDG
TOXIC SOLID, ORGANIC, N.O.S. (Cobalt(II) oxide), MARINE POLLUTANT

IATA
TOXIC SOLID, ORGANIC, N.O.S. (Cobalt(II) oxide)
Transport hazard class(es)
DOT
Class
6.1 Toxic substances.
Label
6.1
Class
6.1 (T2) Toxic substances
Label
6.1
IMDG
Class
6.1 Toxic substances.
Label
6.1
IATA
Class
6.1 Toxic substances
Label
6.1
Packing group
DOT, IMDG, IATA
III
Environmental hazards:
Marine pollutant (IMDG):
Symbol (fish and tree)
Special precautions for user
Warning: Toxic substances
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
N/A
Transport/Additional information:
DOT
Marine Pollutant (DOT):
No
UN "Model Regulation":
UN 3288, Toxic solids, inorganic, n.o.s. (Cobalt(II) oxide), 6.1, III

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture
GHS GHS label elements, including precautionary statements
Hazard pictograms
GHS07
GHS08
Signal word

Warning
Hazard-determining components of labeling:
Cobalt(II) oxide
Cobalt(II,III) oxide
Hazard statements
H302 Harmful if swallowed.
H317 May cause an allergic skin reaction.
H351 Suspected of causing cancer.
Precautionary statements
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.
P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/.../if you feel unwell.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).
SARA Section 313 (specific toxic chemical listings)
1307-96-6 Cobalt(II) oxide
90.0%
1308-06-1 Cobalt(II,III) oxide
10.0%
California Proposition 65
Prop 65 - Chemicals known to cause cancer
1307-96-6 Cobalt(II) oxide
90.0%
Prop 65 - Developmental toxicity
None of the ingredients are listed.
Prop 65 - Developmental toxicity, female
None of the ingredients are listed.
Prop 65 - Developmental toxicity, male
None of the ingredients are listed.
Information about limitation of use:
For use only by technically qualified individuals.
Other regulations, limitations and prohibitive regulations
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006.
None of the ingredients are listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.
None of the ingredients is listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use)
None of the ingredients is listed.

Chemical safety assessment:
A Chemical Safety Assessment has not been carried out.

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16. OTHER INFORMATION

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH). The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. American Elements shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Reseach

- 2D metal–organic-framework array-derived hierarchical network architecture of cobalt oxide flakes with tunable oxygen vacancies towards efficient oxygen evolution reaction. Yuanjian Li, Huanwen Wang, Yuzhu Li, Qiang Wang, Yansheng Gong. Journal of Catalysis, Volume 364, August 2018, Pages 48-56.
- 2D-COS of in situ μ-Raman and in situ IR spectra for structure evolution characterisation of NEP-deposited cobalt oxide catalyst during n-nonane combustion. Damian K. Chlebda, Przemys?aw J. Jod?owski, Roman J. J?drzejczyk, Joanna ?ojewska. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, Volume 186, 5 November 2017, Pages 44-51.
- Characterization of cobalt monoxide thin film modified with silicon dioxide prepared by the cathodic deposition for lithium-ion battery. Jing-Shan Do, Wei-Han Ko, Rui-Feng Dai. Journal of the Taiwan Institute of Chemical Engineers, Volume 51, June 2015, Pages 88-95.
- Charge redistribution of Co on cobalt(II) oxide surface for enhanced oxygen evolution electrocatalysis. Yu He, Xiao-Peng Han, De-Wei Rao, Ya-Dong Zhang, Yi-Da Deng. Nano Energy, Volume 61, July 2019, Pages 267-274.
- Chemical vapor deposition of low reflective cobalt (II) oxide films. Eliane Amin-Chalhoub, Thomas Duguet, Diane Samélor, Olivier Debieu, Constantin Vahlas. Applied Surface Science, Volume 360, Part B, 1 January 2016, Pages 540-546.

- Cobalt/cobaltous oxide based honeycombs for thermochemical heat storage in future concentrated solar power installations: Multi-cyclic assessment and semi-quantitative heat effects estimations. George Karagiannakis, Chrysoula Pagkoura, Eleftherios Halevas, Penelope Baltzopoulou, Athanasios G. Konstandopoulos. Solar Energy, Volume 133, August 2016, Pages 394-407.
- Flower-like porous cobalt(II) monoxide nanostructures as anode material for Li-ion batteries. Anirudha Jena, Tirupathi Rao Penki, N. Munichandraiah, S. A. Shivashankar. Journal of Electroanalytical Chemistry, Volume 761, 15 January 2016, Pages 21-27.
- Electrochemical biosensing of influenza A subtype genome based on meso/macroporous cobalt (II) oxide nanoflakes-applied to human samples. J. Mohammadi, A. Moattari, N. Sattarahmady, N. Pirbonyeh, H. Heli. Analytica Chimica Acta, Volume 979, 1 August 2017, Pages 51-57.
- Hierarchical porous cobalt monoxide nanosheet@ultrathin manganese dioxide nanosheet core-shell arrays for high-performance asymmetric supercapacitor. Xuezhao Wang, Yuanhua Xiao, Dangcheng Su, Shengang Xu, Shaokui Cao. International Journal of Hydrogen Energy, Volume 41, Issue 31, 17 August 2016, Pages 13540-13548.
- Mesoporous cobalt monoxide nanorods grown on reduced graphene oxide nanosheets with high lithium storage performance. Wenjun Zhu, Hui Huang, Yongping Gan, Xinyong Tao, Wenkui Zhang. Electrochimica Acta, Volume 138, 20 August 2014, Pages 376-382.