



Safety Data Sheet (Au flashed Pd Coating Cu Bonding Wire)

1. Product and company identification

A) Product: Au flashed Pd Coating Cu Bonding Wire

B) Recommended use of the chemical and restrictions on use

- ☐ **Recommended use:** Industrial applications: bonding and bumping
- ☐ **Restrictions on use:** None

C) Manufacturer/Supplier/Distributor Information

- ☐ **Name:** MK ELECTRON Co.,Ltd.
- ☐ **Address:** 316-2, Kumeu-ri, Pogok-eup, Cheoin-gu, Yongin-si, Gyeonggi-do, 449-812, Korea
- ☐ **Emergency or information contact, Responsible department**
Tel: +82-031-330-1900
Fax: +82-031-338-6817

2. Hazard identification

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A) Hazard-Risk Classification

- | | |
|--|--|
| <input type="radio"/> Acute toxicity (oral) | Category 4 |
| <input type="radio"/> Skin Corrosion/Irritation | Category 2 |
| <input type="radio"/> Serious Eye Damage/Irritation | Category 2B |
| <input type="radio"/> Specific target organ toxicity (single exposure) | Category 3
(respiratory irritation) |
| <input type="radio"/> Specific target organ toxicity (repeated exposure) | Category 2 |
| <input type="radio"/> Hazards to the aquatic environment (acute hazard) | Category 1 |
| <input type="radio"/> Hazards to the aquatic environment (long term hazard) | Category 1 |

B) Label elements including precautionary statements

- ☐ **Symbol:**



○ **Signal Word:** Warning

○ **Hazard-Risk Statement**

H302	Harmful if swallowed.
H315	Cause skin irritation.
H320	Cause eye irritation.
H335	May cause respiratory irritation.
H373	May cause damage to respiratory through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

○ **Precautionary Statement**

***Prevention**

P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.

*** Response**

P301+312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P330	Rinse mouth.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P321	Specific treatment
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313	If eye irritation persists: Get medical advice/attention.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P314	Get medical advice/attention if you feel unwell.



P391	Collect spillage.
* Storage	
P403+P233	Store in a well-ventilated place. Keep container tightly closed.
* Disposal	
P501	Dispose of contents/container in accordance with local regulation

C) Other Hazard-Risk which is not included in the classification criteria

Chemical Name	NFPA Level (0~4step)		
	Health Hazard	Flammability	Instability
Copper	2	1	0
Palladium	1	1	0
Gold	1	0	0
Silver	1	0	0

3. Composition/Information on ingredients

Product Item	Name	CAS No.	Contents (%)
Au flashed Pd Coating Cu Bonding Wire	Copper	7440-50-8	Min 96%
	Palladium	7440-05-3	Max 3%
	Gold	7440-57-5	Max 1%
	Silver	7440-22-4	Below 15ppm

4. First aid measures

A) Eye contact

Immediately flush eyes with plenty of water for more than 15minutes. Check for and remove any contact lenses. Get medical attention if irritation occurs.

B) Skin contact

Immediately Wash and dry contaminated clothing and shoes before reuse.
Get medical attention immediately.

C) Inhalation

Allow the victim to rest in a well-ventilated area. Seek immediate medical attention. If breathing is difficult, have a trained individual administer oxygen. Get medical attention immediately

D) Ingestion



Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention if large quantities are ingested.

E) Acute and delayed symptoms/effects

- ☐ Eye contact: may cause irritation.

F) Indication of immediate medical attention and notes for physician

- ☐ In case of inhalation, please consider oxygen supply.

5. Fire-Fighting measures

A) Suitable (and unsuitable) extinguishing media

- ☐ Suitable: Dolomite, sand, black lead, soda ash, sodium chloride
- ☐ Unsuitable: Not available

B) Specific hazards arising from the chemical

- ☐ Fires and an explosive risk but not considerable when it is bulk.

C) Special protective equipment and precautions for fire-fighters

Avoid inhalation or breathe substance and combustion products. Use extinguishing agents appropriate for surrounding fire. Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6. Accidental release measures

A) Personal precautions, protective equipment and emergency procedures

- ☐ Occupational exposure: Not normally required. Use an appropriate NIOSH approved respirator if airborne dust concentration exceed the regulations.
- ☐ Ensure adequate ventilation

B) Environmental precautions and protective procedures

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

C) The methods of purification and removal

- ☐ Small spill
In solid form this material poses no special clean-up problems. Use normal clean up. Procedures; wet sweeping or HEPA vacuum, for clean up off dust. Do not use compressed air for cleaning.
- ☐ Large spill
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow evacuating through the system.



7. Handling and Storage

A) Precautions for safe handling

Use only in a well ventilated area. Minimize dust generation and accumulation. Remove contaminated cloths immediately.

B) Conditions for safe storage

Store in a dry and cool area. Store away from strong acid and halogen materials. Store and handle in accordance with the law in force or regulations.

8. Exposure controls and personal protection

A) Control parameters (e.g. occupational exposure limit values, biological limit values)

Chemical name	CAS. No	NIOSH REL-TWA (mg/m ³)		OSHA PEL-TWA (mg/m ³)		ACGIH TLV-TWA (mg/m ³)	
		ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³
Copper	7440-50-8	-	1(dust & mist) 0.1 (fumes)	-	-	-	-
Silver	7440-22-4	-	0.1	-	0.1	-	0.1
Palladium	7440-05-3	-	-	-	-	-	-
Gold	7440-57-5	-	-	-	-	-	-

B) Appropriate engineering controls

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits.

C) Personal protective equipment

☐ Respiratory protection

If engineering controls do not maintain airborne concentrations to an acceptable level, an approved respirator must be worn. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air purifying filter, cartridge or canister.

☐ Eye/Face protection

Wear appropriate protective eyeglasses with side shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

☐ Skin protection

Wear gloves and protective clothing.



9. Physical and chemical properties

A) Appearance	Wire
B) Odour	Odorless
C) Odour threshold	Not available
D) pH	Not applicable
E) Melting point/Freezing point	1084°C
F) Initial boiling point and boiling range	2595°C
G) Flash point	Not applicable
H) Evaporation rate	Not applicable
I) Flammability (solid, gas)	Product is not flammable.
J) Upper/lower flammability or explosive limits	Not available
K) Vapor pressure	Not determined
L) Solubility	Insoluble/ solvent: aqua regia, hot sulfuric acid/weak solubility: sulfuric acid, nitric acid
M) Vapor density	Not applicable
N) Specific gravity	9.0
O) Partition coefficient(n-octanol/water)	Not available
P) Auto-ignition temperature	Not available
Q) Decomposition temperature	Not available
R) Viscosity	Not available
S) Formula mass	Not available

10. Stability and reactivity

A) Chemical stability

This product is stable at normal temperature and pressure.

B) Possibility of hazardous reactions

This product is not reactive

C) Conditions to avoid (e.g. static discharge, shock or vibration, etc.)

Ammonia, oxidizing agents, halogens, and hydrogen peroxide.

D) Incompatibility with various substances

No data

E) Hazardous decomposition products

Decomposition products: Metal fumes.

11. Toxicological information

A) Information on the likely routes of exposure: May exposure by Inhalation, skin and eye



B) Delayed, acute and chronic toxic effect for short and long term exposure

Under normal use of the solid form of this material there are few health hazards. Welding, cutting grinding or any process creating dust, fume or oxide may cause hazardous levels of certain elements, as addressed in Section 2 C).

○ Acute toxicity (Oral)	Category 4 (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	Category 4: Mouse LD50=413 mg/kg bw
○ Acute toxicity (Dermal)	Not available
○ Acute toxicity (Inhalation: Gas)	Not applicable
○ Acute toxicity (Inhalation: Vapor)	Not available
○ Acute toxicity (Inhalation: Dust, Mist)	Not available
○ Skin Corrosion/ Irritation	Category 2 (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	Copper or copper salts may induce allergic contact dermatitis in susceptible individuals
○ Serious Eye Damage/ Irritation	Category 2B (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	Copper fume may cause irritate to eye and nose.
○ Respiratory sensitizer	Not available
○ Skin Sensitization	Not classified (97.5% of this product consist of an ingredient of unknown toxicity)
* Palladium	Palladium may cause allergy reaction in sensitive human skin.
○ Mutagenicity	Not available
○ Carcinogenicity	Not classified (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	US EPA category D
○ Reproductive toxicity	Not classified (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	Information on the developmental and reproductive toxicity of copper in humans following oral exposure was unavailable. Lecyk (1980) observed reduced litter size, decreased fetal weights, and skeletal abnormalities in the offspring of mice fed diets supplemented with 3000 or 4000ppm copper sulfate (155 or 207 mg Cu/kg/day, respectively) for one month prior to



	gestation and on days 0-19 of gestation.)
<input type="radio"/> Specific target organ toxicity (single exposure)	Category 3 (respiratory irritation)
* Copper	The fumes and dust cause irritation of the upper respiratory.
* Palladium	No histopathological effects in rats from single exposure.
<input type="radio"/> Specific target organ toxicity (repeated exposure)	Category 2 (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	Wilson's disease may affect many organs and systems in human and necrosis and accumulation in liver and kidney was shown in rat exposed at $\geq 100\text{mg/kg}$.
<input type="radio"/> Aspiration Hazard	Not available

12. Ecological information

A) Aquatic and terrestrial ecotoxicity	Acute Category 1 (2.5% of this product consist of an ingredient of unknown toxicity)
* Copper	Fish: 96h-LC50 = 0.028 mg/L (<i>P. promelas</i>) Crustacea: 48h-EC50 = 0.03mg/L(<i>D. magna</i>) Algae: 72h-EC50=0.038 mg/L(<i>S.capricornutum</i>)
B) Degradability and persistency	For inorganic substance, it is expected low degradability and high persistence.
C) Bioaccumulative potential	Chronic Category 1 (2.5% of this product consist of an ingredient of unknown toxicity)
<input type="radio"/> bioaccumulation	Bioaccumulation is expected according to the $\text{BCF} \geq 500$
*Copper	$\text{BCF} = 1000 - 1670$ (mollusca)
<input type="radio"/> biodegradation	For inorganic substance, it is not expected rapidly biodegraded.
D) Mobility in soil	Not available
E) Other adverse effects	Not available

13. Disposal considerations



A) Disposal method: Do landfill controlled wastes to public controlled wastes.

B) Disposal precaution: Treat stabilization.

14. Transport information

A) UN Number: Not applicable

B) UN Proper shipping name: Not applicable

C) Transport Hazard class(es): Not applicable

D) Packing group: Not applicable

E) Marine pollutant: Not applicable

F) Special precautions

- In case of fire: Not applicable
- In case of leakage: Not applicable

*The UN No. of copper powder is 3089 and it is considered as marine pollutant.

15. Regulatory information

A) US Federal Regulation

☐ TSCA INVENTORY STATUS

* Copper	TSCA Listed
* Palladium	TSCA Listed
* Gold	TSCA Listed
* Silver	TSCA Listed

☐ SARA SECTION 302 (40CFR372.65): Not regulated

☐ SARA SECTION 313 (40CFR372.65)

* Copper	Regulated (Copper, METAL (as Cu))
* Palladium	Not regulated
* Gold	Not regulated
* Silver	Regulated (SILVER, METAL (as Ag))

☐ SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21)

* Silver	Fire: yes
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☐ CERCLA HAZARDOUS SUBSTANCES

* Copper	Regulated (Copper and Compounds, (as Cu)): 1000 LBS RQ
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- * Palladium Not regulated
- * Gold Not regulated
- * Silver Regulated (SILVER, METAL (as Ag)): 1000 LBS RQ

○ OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

- * Copper Hazardous substances : Copper
- * Palladium Listed
- * Gold Not regulated
- * Silver Hazardous substances : Silver: 1000 lbs

B) European Regulation

○ EINECS (European Inventory of Existing Commercial Chemical Substances):

- * Copper EINECS No.: 231-159-6
- * Silver EINECS No.: 231-131-3
- * Palladium EINECS No.: 231-115-6
- * Gold EINECS No.: 231-165-9

○ Label information according to the Directive 67/548/EEC and 1999/45/ECC.

- * Silver R41 Risk of serious damage to eyes

C) Canada Regulation

○ Workplace Hazardous Materials Information System:

- * Copper CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
- * Palladium CLASS B-4: Flammable solid.
- * Gold Not regulated
- * Silver CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2B: Material causing other toxic effects (TOXIC).

○ Workplace Hazardous Materials Information System Hazard classification:

- * Palladium B/4
- * Silver D/1/B, D/2/B

D) Other Regulations

○ Korea

Toxic Substance Control Act:: listed

- * Copper Existing chemical KE-08896
- * Palladium Existing chemical KE-27744
- * Gold Existing chemical KE-18083
- * Silver Existing chemical KE-31261



16. Other information

A) Information source and references

- Korea occupational safety & health agency: <http://www.kosha.net>
- National chemicals information systems: <http://ncis.nier.go.kr/>
- Korea dangerous material inventory management system: <http://hazmat.nema.go.kr/>
- ECB (European Chemicals Bureau): <http://ecb.jrc.it/esis/>
- US EPA ECOTOX: http://cfpub.epa.gov/ecotox/quick_query.htm
- HSDB (Hazardous substances data bank): <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>
- OECD SIDS: <http://www.chem.unep.ch/irptc/sids/OECD/SIDS/sidspub.html>
- Integrated Risk Information System (<http://www.epa.gov/ncea/iris/subst>)
- <http://www.sciencelab.com/xMSDS-Palladium-9926373>
- <http://www.sciencelab.com/xMSDS-Copper-9923549>
- <http://www.sciencelab.com/xMSDS-Silver-9927253>

B) Issuing date: 7 November 2012

C) Revision number and date:

Revision number: 2

Date of the latest revision: 19 July 2018 (No change/Only review)

D) Others

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