SECTION 1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

1.1 Product identifiers

Trade Name	Copper Tin (Cu-Sn) Alloy Nanopowder/Nanoparticles, Size: 35-95 nm, Sn:Cu/1:9
Product Number	NG04EO2702

Copper powder (CAS# 7440-50-8): 90%

Tin Powder (CAS# 7440-31-5): 10%

1.2 Relevant identified uses of the substance or mixture and uses adviced against

Use of the substance/mixture	Research

1.3 Details of the supplier of safety data sheet

Company	Nanografi Nanotechnology
Address	ODTÜ Teknokent İkizler Binası B-1/H ODTÜ Teknokent 06531- ANKARA
Phone	+90 312 285 85 09
Fax	+90 312 210 13 09

1.4 Emergency Telephone Number

Emergency Telephone Number	+90 312 285 85 09

SECTION 2 HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

EMERGENCY OVERVIEW

Xn Harmful

F Highly flammable

HMIS ratings (scale 0-4)

(Hazardous Materials Identification System)

Health (acute effects) = 1

Flammability = 3

Reactivity = 1

NFPA RATING

HEALTH: 1

FLAMMABILITY: 3

REACTIVITY: 1

SECTION 3 COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Copper Tin (Cu-Sn) Alloy Nanopowder/Nanoparticles, Size: 35-95 nm, Sn:Cu/1:9

Copper powder (CAS# 7440-50-8): 10%

Tin Powder (CAS# 7440-31-5): 90%

SECTION 4 FIRST AID MEASURES

4.1 Most important symptoms and effects, including acute and delayed

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Urine acetone test may be helpful in diagnosis. Hemodialysis should be considered in severe intoxication. Treat symptomatically and supportively.

4.2 Indication of any immediate medical attention and special treatment needed

No data available.

4.3 Other Information

No data available

SECTION 5 FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing agents

Special powder for metal fires. Do not use water.

Protective equipment:

Wear self-contained respirator.

Wear fully protective impervious suit.

SECTION 6 ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions	Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Do not allow material to be released to the environment.

6.3 Methods and material for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

See Section 13 for disposal information.

SECTION 7 HANDLING AND STORAGE

7.1 Precautions for safe handling

Precautions for Safe Handling	Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage Conditions	Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace-

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

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.

Additional information: No data

Personal protective equipment

General protective and hygienic measures

1. The usual precautionary measures for handling chemicals should be followed.
2. Keep away from foodstuffs, beverages and feed.

3. Remove all soiled and contaminated clothing immediately.

4. Wash hands before breaks and at the end of work.

Breathing equipment:

Use suitable respirator when high concentrations arepresent.

Protection of hands: Impervious gloves

Eye protection:

Safety glasses

Full face protection

Body protection:

Protective work clothing.

8.2 Exposure controls

Components with limit values that require monitoring at the workplace:

Tantalum and compounds (as W)

Copper fume, dusts and mists (as Cu) mg/m3 ACGIH TLV 1 (dust, mist); 0.2 (fume) Austria MAK

1 0.1 (fume) Belgium TWA 0.2 (fume); 1 (dust) Denmark TWA 0.1 Finland TWA 0.2 (fume); 1 (dust) France VME 0.2 (fume); 1 (dust) 1; 2-STEL (dust) Germany MAK 0.1 (fume); 1 (dust) Hungary TWA 0.2; 0.4-STEL (dust) Netherlands MAC-TGG 1 (dust) Norway TWA 0.05 0.1 (fume) Poland TWA 0.1; 0.3-STEL (fume) 1; 2-STEL (dust) Russia 1-STEL (dust) Sweden NGV 0.2 (resp. dust); 1 (total dust) Switzerland MAK-W 0.1; 0.2-KZG-W (fume) 1; 1-KZG-W United Kingdom TWA 0.2 (fume) 1; 2-STEL (dusts and mists as Cu) 1; 3-STEL USA PEL 0.1 (fume, dusts & mists)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

General Information

Form: Powder

Color: Black

Odor: Odorless

Value/Range Unit Method

Change in condition

Melting point/Melting range: 1083 °C
Boiling point/Boiling range: 2595 °C
Sublimation temperature / start: Not determined
Flash point: Not applicable
Flammability (solid, gaseous): Product is not flammable.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Danger of explosion:
Product does not present an explosion hazard.
Explosion limits:
Lower: Not determined
Upper: Not determined
Vapor pressure: Not determined
Solubility in / Miscibility with
Water: Insoluble
Not determined

9.2 Other information

No data available.

SECTION 10 STABILITY AND REACTIVITY

10.1 Reactivity

No dangerous reactions known.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available.

10.4 Conditions to avoid

No data available.

10.5 Hazardous decomposition products

no data available – In the event of fire: see section 5

SECTION 11 TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity:

Primary irritant effect:

On the skin: Irritant to skin and mucous membranes.

On the eye: Irritating effect.

Sensitization: No sensitizing effects known.

Other information (about experimental toxicology):

Tumorigenic effects have been observed on tests with laboratory animals. Reproductive effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:

Copper compounds may be irritating to the skin, eyes and respiratory tract. They may cause metal fume fever, hemolysis of the red blood cells and injury to the liver, lungs, kidneys and pancreas. Ingestion may also cause vomiting, gastric pain, dizziness, anemia, cramps, convulsions, shock, coma and death. Copper solutions may cause sensitization reactions.

Additional toxicological information:

The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals: Gastrointestinal - nausea or vomiting. Liver - hepatitis (hepatocellular necrosis), zonal Liver - other changes. Related to Chronic Data - death. Kidney, Ureter, Bladder - other changes. Cardiac - other changes. Tumorigenic - equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration - fibrosis, focal (pneumoconiosis). Lung, Thorax, or Respiration - tumors. Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus). Reproductive - Specific Developmental Abnormalities - Central Nervous System. Reproductive - Specific Developmental Abnormalities - musculoskeletal system. Reproductive - Fertility - pre- implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea) Reproductive

- Fertility - post-implantation mortality (e.g. dead/or resorbed implants per total number of implants). Reproductive - Maternal Effects - uterus, cervix, vagina. Reproductive - Fertility - female fertility index (e.g. # females pregnant per # sperm positive females; # females pregnant per # females mated)

SECTION 12 ECOLOGICAL INFORMATION

12.1 Ecotoxicity

No data available.

12.2 Persistance and degradability

No data available.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other adverse effects

No data available.

SECTION 13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product	Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging	Dispose of as unused product.

SECTION 14 TRANSPORT INFORMATION

DOT regulations:
Hazard class: 4.1
Land transport ADR/RID (cross-border)
ADR/RID class: 4.1 Substances which, in contact with water, emit flammable gases
Maritime transport IMDG:
IMDG Class: 4.1
Air transport ICAO-TI and IATA-DGR:
ICAO/IATA Class: 4.1
Transport/Additional information: Not dangerous according to the above specifications.

SECTION 15 REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

SECTION 16 OTHER INFORMATION

Further information

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. Employers should use this information only as a supplement to other information gathered by them, and should make independent judgment 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 Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.