

# MATERIAL SAFETY DATA SHEET

## Nickel Nanostrands

March 1, 2004

Metal Matrix Composites Company  
P.O. Box 356, Midway, Utah 84049  
435-654-4958

### HAZARDOUS INGREDIENTS

- |                                       |                             |
|---------------------------------------|-----------------------------|
| • Hazardous Ingredients               | <b>Nickel (Ni)</b>          |
| • Calculated Composition              | 100 %                       |
| • C.A.S. No.                          | 7440-02-0                   |
| • PEL <sub>1</sub> -mg/m <sup>3</sup> | 1                           |
| • TLV <sub>2</sub> -mg/m <sup>3</sup> | 1.5 (As inhalable fraction) |

### PHYSICAL and CHEMICAL DATA

- |   |       |
|---|-------|
| • Spongy like mass of micron or sub-micron nickel strands, or screened powder form of the sponge. |       |
| • Ingredient  | Ni    |
| • Mol. wt.  | 58.71 |
| • Specific Gravity  | 8.9   |
| • m.p. °C   | 1453  |
| • b.p. °C   | 2732  |
| • Sol. in H <sub>2</sub> O g/100ml  | 0     |
| •   |       |

### HEALTH HAZARDS

Nickel

LD<sub>50</sub> ORAL RAT >9000 mg/kg

#### **Inhalation:**

In 1997, the ACGIH categorized elemental nickel as: A5 "Not Suspected as a Human Carcinogen". Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard. The inhalation of nickel powder has not resulted in an increased incidence of malignant lung tumors in rodents.

Inhalation of nickel may induce asthma. This effect is rare, it has been reported in welders where exposures to nickel are often mixed with other chemical substances. Persons with a known history of nickel sensitive asthma should avoid such contact.

#### **Skin Contact:**

Prolonged and intimate contact with metallic nickel may cause irritation to the skin and nickel sensitivity which may result in allergic skin rashes.

#### **Preexisting Conditions:**

Prolonged and intimate skin contact can cause an allergic skin rash in previously sensitized individuals.

#### **Wounds:**

Nickel metal powder has caused tumors at the site of injection in rodents. The National Toxicology Program has listed nickel as reasonably anticipated to be a carcinogen based on the production of injection site tumors. However, studies do not suggest a significant risk for humans from nickel-containing prostheses.

#### **Ingestion:**

The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded there is no evidence that nickel and its inorganic compounds are carcinogenic when ingested. The U.S. Food and Drug Administration has affirmed that nickel is generally recognized as safe (GRAS) as a direct human food ingredient.

## **PRECAUTIONS FOR SAFE STORAGE, HANDLING AND USE**

### **Do not inhale nanostrands.**

- Ventilation is required when handling or using this product to keep exposure to airborne nickel below the exposure limit. Maintain airborne nickel levels as low as possible.
- If room or hood ventilation alone cannot so control exposure, use NIOSH-approved respirators.
- Keep container closed when not in use.

### **Avoid repeated skin contact.**

- Wear suitable gloves.
- Wash skin thoroughly after handling.
- Launder clothing and gloves as needed.

### **Do not store near acids or reactive substances.**

- Nickel can react with acids to liberate hydrogen gas, which can form explosive mixtures in air.
- Nickel can react with oxidizing or reactive substances.
- Under special conditions nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, Ni(CO)<sub>4</sub>, a toxic gas.
- Metal nanostrands heat treated in reducing atmospheres may become spontaneously combustible.

## **SPILL, LEAK AND DISPOSAL PROCEDURE**

- Collect spills by wet sweeping compound or by vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if the exhaust is discharged into the workplace.
- Wear appropriate NIOSH-approved respirators if collection and disposal of spills is likely to cause the concentration of airborne contaminants to exceed the exposure limits.
- Follow EPA and local regulations for waste disposal.

## **EMERGENCY AND FIRST AID PROCEDURES**

- For skin rashes, seek medical attention.
- Cleanse wounds thoroughly to remove any particles.
- If exposure to nickel carbonyl is suspected, seek medical attention immediately.

## **SARA SECTION 313 SUPPLIER NOTIFICATION**

This product contains the following chemical(s) subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:

### **Nickel**

Refer to the Hazardous Ingredients section of this **MSDS** for the appropriate CAS numbers and percent by weight.

*This MSDS describes possible health hazards of the product supplied. If user operations change it to other chemical forms, whether as end products, intermediates or fugitive emissions, the possible health hazards of such forms must be determined by the user.*

*Metal Matrix Composites Company believes that the information in this Material Safety Data Sheet is accurate.; however ,the company makes no express or implied warranty as to the accuracy of such information and expressly disclaims any liability resulting from reliance on such information.*