Aluminum Nanoparticles (Al)

US Research Nanomaterials, Inc.

Material Safety Data Sheet

acc. to OSHA and ANSI

1 Identification of substance:

- **Product details:**
- **Trade name:** Aluminum powder
- **Stock number:** US1050
- **Manufacturer/Supplier:**

US Research Nanomaterials, Inc.
3302 Twig Leaf Lane
Houston, Texas 77084, USA
www.us-nano.com

3 Composition/Data on components:

- **Chemical characterization:**

Description: (CAS#)

Aluminum (CAS# 7429-90-5), 100%

- **Identification number(s):**
- **EINECS Number:** 231-072-3
- **EU Number:** 013-001-00-6

4 Hazards identification

- EMERGENCY OVERVIEW

Pyrophoric (USA) Highly Flammable (EU). Irritant.

Spontaneously flammable in air. Irritating to eyes and respiratory system.

- HMIS RATING

HEALTH: 2

FLAMMABILITY: 3

REACTIVITY: 4

- NFPA RATING

HEALTH: 2

FLAMMABILITY: 3

REACTIVITY: 4

5 First aid measures

- **After inhalation**

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.

6 Fire fighting measures

- **Suitable extinguishing agents**

Special powder for metal fires. Do not use water.

- **For safety reasons unsuitable extinguishing agents** Water

- **Protective equipment:**

Wear self-contained respirator.
Wear fully protective impervious suit.

7 Accidental release measures

- **Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources

- **Measures for environmental protection:**
  Do not allow material to be released to the environment without proper governmental permits.
- **Measures for cleaning/collecting:**
  Ensure adequate ventilation.
  Do not flush with water or aqueous cleansing agents
  Keep away from ignition sources.
- **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.

8 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.
- **Information about protection against explosions and fires:**
  Keep ignition sources away.
  Substance/product is self ignitable.
- **Storage**
- **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 water/moisture.
  Do not store together with acids.
- **Further information about storage conditions:**
  Keep container tightly sealed.
  Store in cool, dry conditions in well sealed containers.

9 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:

Aluminum powder	mg/m3
ACGIH TLV	10
Belgium TWA	10
Denmark TWA	10
Finland TWA	10
France TWA	10
Germany MAK	6
Hungary TWA	2
Ireland TWA	10
Netherlands TWA	10
Sweden TWA	5
Switzerland TWA	6
United Kingdom TWA	10
USA PEL (respirable)	5

- **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

- **Eye protection:**
  Safety glasses
  Full face protection

- **Body protection:** Protective work clothing.

10 Physical and chemical properties:

- **General Information**

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

	Value/Range	Unit	Method
Change in condition			
Melting point/Melting range:	660	° C	
Boiling point/Boiling range:	2467	° C	
Sublimation temperature / start:	Not determined		
Flash point:	Not applicable		

- **Flammability (solid, gaseous)**
  Contact with water liberates extremely flammable gases.
- **Ignition temperature:** 400 ° C
- **Decomposition temperature:** Not determined
- **Auto igniting:** Spontaneously flammable in air.
- **Explosion limits:**
- **Lower:** Not determined
- **Upper:** Not determined
- **Vapor pressure:** Not determined
- **Density:** at 20 ° C 2.699 g/cm³
- **Solubility in / Miscibility with**
- **Water:**
  Contact with water releases flammable gases
  Not determined

11 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

- **Materials to be avoided:**
- **Dangerous reactions**
  Contact with water releases flammable gases
  Spontaneously flammable in air.
- **Dangerous products of decomposition:** Hydrogen

12 Toxicological information

- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Subacute to chronic toxicity:**
  Aluminum may be implicated in Alzheimers disease.
  Inhalation of aluminum containing dusts may cause pulmonary disease.
- **Additional toxicological information:**
  To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
  No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

13 Ecological information:

- **General notes:**
  Do not allow material to be released to the environment without proper governmental permits.

14 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.

15 Transport information

- **DOT regulations:**
- **Hazard class:** 4.3
- **Identification number:** UN1396
- **Packing group:** II
- **Poison inhalation hazard:** No
- **Proper shipping name (technical name):** Aluminum powder, uncoated
- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** 4.3 Substances which, in contact with water, emit flammable gases
- **Item:** 13b
- **Danger code (Kemler):** 423
- **UN-Number:** 1396
- **Description of goods:** Aluminium powder, uncoated
- **Maritime transport IMDG:**
- **IMDG Class:** 4.3
- **UN Number:** 1396
- **EMS Number:** 4.2-02
- **Proper shipping name:** Aluminium powder, uncoated

- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 4.3
- **UN/ID Number:** 1396
- **Proper shipping name:** Aluminum powder, uncoated

15 Regulations

- **Product related hazard informations:**
- **Hazard symbols:** F Highly flammable
- **Risk phrases:**
  15 Contact with water liberates extremely flammable gases.
  17 Spontaneously flammable in air.
- **Safety phrases:**
  7/8 Keep container tightly closed and dry.
  43 In case of fire, use metallic extinguishing powder. Never use water.
- **National regulations**
  All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory.
- **Information about limitation of use:**
  For use only by technically qualified individuals.

16 Other information:

- 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.