

NDCerium Gadolinium Oxide

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: NDCERIUM GADOLINIUM OXIDE NANOPARTICLES (Dry)

CHEMICAL FAMILY: Inorganic metallic compound

MANUFACTURER: NanoDynamics, Inc
901 Fuhrmann Blvd.
Buffalo, New York 14203

FOR MORE INFORMATION CALL: 716-853-4900

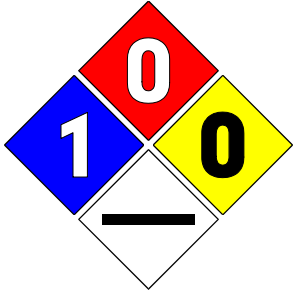
IN CASE OF EMERGENCY CALL: For Chemical Emergency Spill, Leak, Fire Exposure or Accident Call CHEMTREC Day or Night (1-800- 424-9300)

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>INGREDIENT NAME:</u>	<u>CAS NUMBER</u>	<u>WEIGHT %</u>
Cerium oxide	1306-38-3	70 - 95
Gadolinium oxide	12064-62-9	5 - 30

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:
Yellow powder, no odor.
Caution! May be harmful if inhaled. May cause respiratory tract irritation. Prolonged or repeated inhalation may cause chronic respiratory disease. Overexposure may affect the blood and liver. Avoid and control operations which generate dust.

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POTENTIAL HEALTH HAZARDS

TARGET ORGANS: Skin, eyes, respiratory system, digestive system

ACUTE HEALTH HAZARDS:

SKIN: May cause mild irritation as an abrasive.

EYES: May cause mild irritation as a foreign body irritant. Symptoms may include tearing and blinking.

INHALATION: May be harmful if inhaled. Inhalation may cause mild, temporary irritation, coughing and shortness of breath.

INGESTION: May be harmful if swallowed. Ingestion may cause nausea, vomiting and diarrhea.

CHRONIC AFFECTS: Prolonged or repeated inhalation could cause reduced pulmonary function and chronic pulmonary fibrosis (lung disease or ‘pneumoconiosis’). This product may also have an anti-coagulant affect on the blood, which will increase blood clotting time. Overexposure may cause changes in liver function.

PRE-EXISTING MEDICAL CONDITIONS AGGRAVATED: May aggravate pre-existing respiratory problems.

4. FIRST AID MEASURES

SKIN: Wash skin thoroughly with soap and water, while removing contaminated clothing. Obtain medical attention if irritation persists. Launder clothing before reuse.

EYES: Immediately flush eyes with running water for a minimum of 10 to 15 minutes. Obtain medical attention if irritation persists.

INHALATION: Remove person to fresh air. If breathing is difficult, administer oxygen. Obtain medical attention if irritation persists.

INGESTION: Do not induce vomiting. Obtain medical attention if irritation persists. Never give anything by mouth to an unconscious or convulsing person.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: N/Av
AUTOIGNITION TEMPERATURE: N/Av
UPPER FLAME LIMIT (volume % in air): N/Av
LOWER FLAME LIMIT (volume % in air): N/Av
FLAME PROPAGATION RATE (solids): N/Av

OSHA FLAMMABILITY CLASS: Not considered flammable. When present as a finely divided dust cloud, the material may present a dust explosion hazard.

EXTINGUISHING MEDIA: Use media suitable to the surrounding fire, such as water spray, carbon dioxide, foam or dry chemical.

SPECIAL FIRE FIGHTING PRECAUTIONS / INSTRUCTIONS: Do not enter fire area without proper protection. Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece. Move containers from fire area if it can

be done without risk. Water spray may be useful in cooling equipment exposed to heat and flame.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Keep all other personnel upwind and away from the spill/release.

Environmental precautions: Ensure spilled product does not enter drains, sewers, waterways or confined spaces.

Spill response/Cleanup: Ventilate area of release. Stop leak if you can do so without risk. Using HEPA vacuum, wet vacuum, or other dustless methods, gather up spilled material and place in suitable container for later disposal (see Section 13). Avoid generating dust. Contaminated absorbent material may pose the same hazards as the spilled product. Notify the appropriate authorities as required.

Prohibited materials: None known.

Special spill response procedures: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8002).

DOT/CERCLA Reportable quantity (RQ): None reported.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

Safe handling procedures: This material may be a harmful solid. Wear suitable protective equipment for dusty conditions during handling. Use only in a well-ventilated area. Avoid breathing dusts or fumes. Avoid contact with eyes, skin and clothing. Avoid and control operations which create dust. Keep away from acids and other incompatibles. Keep container tightly closed when not in use. Assume empty containers contain residues, which are hazardous. Wash hands before eating, drinking, smoking or use of toilet facilities. Immediately remove soiled clothing and wash it thoroughly before reuse.

Storage requirements: Store in a cool, dry, well-ventilated area away from incompatibles. Storage area should be clearly identified, clear of obstruction and accessible only to trained personnel. Inspect periodically for damage or leaks.

Special packaging materials: Always keep in containers made of the same materials as the supply container.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use adequate ventilation to maintain air contaminants below exposure limits. Local or exhaust ventilation recommended for prolonged exposures or if the TLV is not known.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Protective gloves impervious to the material should be worn during use. Advice should be sought from glove suppliers. Additional protective clothing, such as long sleeve shirts and/or coveralls, are recommended. An eyewash station and safety shower should be made available in the immediate working area.

EYE PROTECTION: Use chemical goggles to prevent dusts from entering the eyes. Contact lenses should not be worn.

RESPIRATORY PROTECTION: Respiratory protection is required if the airborne concentration exceeds the TLV. Use NIOSH-approved respirators suitable for dusts. Advice should be sought from respiratory protection specialists.

GENERAL HYGIENE CONSIDERATIONS: Avoid inhalation of dusts or fumes. Avoid contact with eyes, skin and clothing. Do not eat, drink or smoke when working. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Immediately remove soiled clothing and wash it thoroughly before reuse.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>
Cerium oxide	N/Av	N/Av
Gadolinium oxide	N/Av	N/Av

¹ = Limit established by General Chemical Corporation

² = Workplace Environmental Exposure Level (AIHA)

³ = Biological Exposure Index (ACGIH)

This material is classified as hazardous under OSHA regulations (29CFR 1910.1200).

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Yellow powder
PHYSICAL STATE:	Solid
ODOR:	No Odor
SPECIFIC GRAVITY (water = 1.0):	N/Av
SOLUBILITY IN WATER (weight %):	Insoluble
pH:	N/Av
BOILING POINT:	N/Av
MELTING POINT:	N/Av
VAPOR PRESSURE:	N/Av
VAPOR DENSITY (air = 1.0):	N/Av
EVAPORATION RATE:	N/Av
% VOLATILES:	N/Av

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (CONDITIONS TO AVOID): Stable under the recommended storage and handling conditions prescribed.

INCOMPATIBILITIES: Acids, strong oxidants.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid extreme heat, flame and dusty conditions.

11. TOXICOLOGICAL INFORMATION

TOXICOLGIAL DATA: There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

<u>Ingredients</u>	<u>inh, rat</u>	<u>LC₅₀(4hr) oral, rat</u>	<u>LD₅₀ (mg/kg) dermal, rabbit</u>
Cerium oxide	N/Av	>5000	N/Av
Gadolinium oxide	N/Av	>5000	N/Av

CARCINOGENICITY: None of the ingredients listed are classified by IARC, ACGIH, NTP or OSHA as carcinogenic.

REPRODUCTIVE EFFECTS, TERATOGENICITY, MUTAGENICITY: None known.

SENSITIZATION TO MATERIAL: None known.

SYNERGISTIC MATERILS: Not available.

OTHER IMPORTANT HAZARDS: None known.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: The ecological characteristics of this product have not been fully investigated. The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment.

CHEMICAL FATE INFORMATION: There is no data available on the product itself.

13. DISPOSAL CONSIDERATIONS

HANDLING FOR DISPOSAL: Handle according to recommendations listed in Section 7.

METHODS OF DISPOSAL: Dispose in accordance with all applicable federal, state and local regulations. Contact your local, state or federal environmental agency for specific rules.

RCRA: If this product, as supplied, becomes a waste, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. It is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

U.S. 49 CFR information: Not regulated for shipments by ground within the continental United States.

IATA / ICAO information: Not regulated for shipments by air, internationally.

15. REGULATORY INFORMATION

U.S. INFORMATION:

TSCA INFORMATION: All ingredients are listed on the TSCA inventory.

EPA / CERCLA (40 CFR 302.4) information: None known

SARA TITLE III: Sec. 313, Toxic Chemicals Notification, 40 CFR 372: This product is not subject to the TSCA notification requirements, since it does not contain any Toxic Chemical constituents.

CALIFORNIA PROPOSITION 65: To the best of our knowledge, this product does not contain any chemicals known to the State of California to cause cancer or reproductive harm.

NEW JERSEY LABELING REQUIREMENTS: This product contains the following substances required to be disclosed on product labeling:

<u>CHEMICAL NAME</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>NEW JERSEY HAZARDOUS Substance</u>
Cerium oxide	1306-38-3	70 - 95	No
Gadolinium oxide	12064-62-9	5 - 30	No

INTERNATIONAL INFORMATION:

CANADIAN CEPA INFORMATION: All ingredients listed are present on the DSL.

CANADIAN WHMIS CLASSIFICATION: Class D2B – Materials Causing Other Toxic Effects, Toxic Material.

16. OTHER INFORMATION

Legend: ACGIH: American Conference of Governmental Industrial Hygienists

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980

NIOSH: National Institute of Occupational Safety and Health

CAS: Chemical Abstract Services

CEPA: Canadian Environmental Protection Act

CFR: Code of Federal Regulations

DOT: Department of Transportation

DSL: Domestic Substances List

EPA: Environmental Protection Agency

EST: Eastern Standard Time

HSDB: Hazardous Substances Data Bank

IARC: International Agency for Research on Cancer

N/Ap: not applicable

IATA: International Air Transport Association

N/Av: not available

ICAO: International Civil Aviation Organization

NTP: National Toxicology Program

OSHA: Occupational Safety and Health Administration

PEL: Permissible Exposure Limit

RCRA: Resource Conservation and Recovery Act

TLV: Threshold Limit Values

SARA: Superfund Amendments & Reauthorization Act

TSCA: Toxic Substance Control Act

WHMIS: Workplace Hazardous Materials Information System

References:

1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2004.
2. International Agency for Research on Cancer Monographs, searched 2005.
3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, searched 2005 (Chempendium, HSDB and RTECs).
4. U.S. EPA Title III List of Lists – January 27, 2005 version.
5. California Proposition 65 List – May 27, 2005 version.

CURRENT ISSUE DATE: 8/1/05

PREVIOUS ISSUE DATE: N/A

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING: N/A

OTHER INFORMATION: N/A