

Silver Pre-Dispersion in Ethanol

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: The following products are covered by this MSDS:
S2-30E
S2-80E
S3-500E

MANUFACTURER:

NanoDynamics Inc.
901 Fuhrmann Blvd.
Buffalo, NY, U.S.A., 14203
Phone: 716-853-4900 (8 AM to 5 PM EST,
Monday to Friday)

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

INGREDIENT	CAS NUMBER	WEIGHT %
Silver	7440-22-4	See Section # 16
Ethanol	64-17-5	See Section # 16

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

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Dark gray / black paste, alcohol odor.
Warning! Flammable liquid and vapor. May be harmful if inhaled or swallowed. May cause headache, drowsiness or other effects to the central nervous system. Causes eye irritation. May cause respiratory tract irritation. Prolonged or repeated contact may dry skin and cause irritation. Prolonged or repeated inhalation, ingestion or skin contact may cause a permanent discoloration of skin, eyes and mucous membranes, a condition called 'argyria'. Contains material which can cause adverse liver effects. Possible developmental hazard - contains material that may cause mutations to reproductive cells, based on animal data.

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POTENTIAL HEALTH HAZARDS

ACUTE HEALTH HAZARDS

TARGET ORGANS: Skin, digestive system, kidneys, and nervous system.

ROUTES OF EXPOSURE: Skin contact, eye contact, inhalation, ingestion.

SKIN: May cause mild irritation and redness. This product may be absorbed through the skin, however harmful effects are not expected through skin absorption.

EYES: May cause moderate to severe irritation, redness and pain.

INHALATION: May be harmful if inhaled. Inhalation may cause irritation to the nose, throat, and respiratory tract. Symptoms may include headache, nausea, dizziness, drowsiness and other central nervous system effects.

INGESTION: Harmful if swallowed. Inhalation may cause irritation to the mouth, throat, and stomach. Symptoms may include headache, nausea, dizziness, drowsiness and other central nervous system effects. This product may present an aspiration hazard. Aspiration into the lungs following ingestion may cause life-threatening lung injury.

CHRONIC AFFECTS: Prolonged or repeated overexposure could cause adverse liver effects. Prolonged or repeated skin contact could cause drying, cracking and defatting of the skin (dermatitis). Prolonged or repeated inhalation, skin contact or ingestion may cause a permanent bluish discoloration of the skin, eye and mucous membranes, a condition called argyria.

PRE-EXISTING MEDICAL CONDITIONS AGGRAVATED: May aggravate pre-existing eye, skin and nervous system disorders.

4. FIRST AID MEASURES

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

EYES: Immediately flush eyes with running water for at least 15 minutes. Obtain medical attention immediately.

INHALATION: If inhaled, immediately remove victim to fresh air. If breathing is difficult, administer oxygen by qualified personnel only. Obtain medical attention.

INGESTION: If swallowed, DO NOT induce vomiting. Obtain medical attention immediately. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT:	54 - 72° F / 12 – 22° C (Estimated)
AUTOIGNITION TEMPERATURE:	363° C
UPPER FLAME LIMIT (volume % in air):	3.3%
LOWER FLAME LIMIT (volume % in air):	19.0%
OSHA FLAMMABILITY CLASS:	IB Flammable liquid

EXTINGUISHING MEDIA: Water fog, foam, dry chemical or carbon dioxide. Do not use water jet, as this may spread burning material.

FIRE HAZARDS/CONDITIONS OF FLAMMABILITY: This material is considered a flammable liquid. It will be ignited by heat, sparks, flame and other ignition sources. Vapours are heavier than air and will collect in confined or low-lying areas. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.

SPECIAL FIRE FIGHTING PRECAUTIONS / INSTRUCTIONS: Fire fighters should wear proper protective equipment and self-contained breathing apparatus operated in positive pressure mode. Move containers from fire area if it can be done without risk. Water spray may be useful in minimizing or dispersing vapours, and cooling equipment and containers exposed to heat and flame. Avoid spreading burning liquid with water spray used for cooling purposes. Do not direct a solid stream of water into hot, burning material; this may spread burning material.

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. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.

ENVIRONMENTAL PRECAUTIONS: Ensure spilled product and flush solutions do not enter drains, sewers, waterways or confined spaces.

SPILL RESPONSE/CLEANUP: Eliminate all sources of ignition. Ventilate area of release. Stop leak if you can do so without risk. Contain and absorb with non-combustible, inert absorbent material and place in suitable container for later disposal (see Section 13). Flush area with water. Contaminated absorbent material may pose the same hazards as the spilled product. Notify the appropriate authorities as required.

PROHIBITED MATERIALS: Do not use combustible absorbents, such as sawdust.

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 is a flammable, harmful liquid. Wear protective equipment during handling. Use in a well ventilated area. Avoid inhalation of vapours or mists. Avoid contact with skin, eyes, and clothing. Wash thoroughly after handling. Keep away from heat, sparks and flame. Ground all equipment during handling. Keep away from oxidizing agents and other incompatibles. Use caution when opening cap. Keep containers tightly closed when not in use. Assume empty containers contain residues, which are hazardous.

STORAGE REQUIREMENTS: Store in a cool, dry, well-ventilated area away from incompatible materials. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Use general or local exhaust ventilation to meet TLV requirements.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Chemically protective gloves impervious to the material must be worn during use. Use chemical-resistant apron and other clothing to avoid skin contact. An eyewash station and safety shower should be made available in the immediate working area.

EYE PROTECTION: Use chemical goggles. A face shield may also be necessary when eye contact may occur.

RESPIRATORY PROTECTION: Respiratory protection is required if the airborne concentration exceeds the TLV or is not known. Wear a NIOSH-approved respirator. Advice should be sought from respiratory protection specialists.

GENERAL HYGIENE CONSIDERATIONS: Avoid inhalation of vapors and mists. Avoid contact with eyes, skin and clothing. Do not eat, drink or smoke when working. Remove contaminated clothing promptly, and launder before re-wearing. Inform laundry personnel of contaminant's hazards. Wash hands thoroughly after handling.

EXPOSURE GUIDELINES

<u>INGREDIENT NAME</u>	<u>ACGIH TLV</u>	<u>OSHA PEL</u>
Ethanol	1000 ppm	1000 ppm
Silver	0.1 mg/m ³ (metal)	0.01 mg/m ³ (metal & soluble compounds)

¹ = Limit established by General Chemical Corporation

² = Workplace Environmental Exposure Level (AIHA)

³ = Biological Exposure Index (ACGIH)

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Dark Gray / Black
PHYSICAL STATE:	Paste
ODOR:	Alcohol
SPECIFIC GRAVITY (water = 1.0):	1.3
SOLUBILITY IN WATER (weight %):	Insoluble.
pH:	N/Av
BOILING POINT:	78° C, 172° F
MELTING POINT:	N/Av
VAPOR PRESSURE:	7.87 kPa / 59.3 mmHg @ 77° F / 25° C
VAPOR DENSITY (air = 1.0):	>1
EVAPORATION RATE:	N/Av
% VOLATILES:	60 - 65

(Flash point method and additional flammability data are found in Section 5.)

10. STABILITY AND REACTIVITY

STABILITY AND REACTIVITY: Stable under the recommended storage and handling conditions prescribed.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid sources of heat, sparks and flame. Avoid contact with incompatibles.

MATERIALS TO AVOID (INCOMPATIBLES): Strong oxidizing agents, strong acids, strong bases, acetylene, ammonia.

11. TOXICOLOGICAL INFORMATION

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

Ingredients	LC₅₀(4hr) inh, rat	LD₅₀ (mg/kg) oral, rat	dermal, rabbit
Ethanol	21,000 ppm	7060	N/Av
Silver	N/Av	>5000	N/Av

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

REPRODUCTIVE EFFECTS, TERATOGENICITY, AND MUTAGENICITY: Contains Ethanol. Ethanol may cause mutations to germ (reproductive) cells and somatic (non-reproductive) cells, based on animal data.

SENSITIZATION TO MATERIAL: None known.

SYNERGISTIC MATERIALS: Not available.

OTHER IMPORTANT HAZARDS: CNS depression may result from exposure.

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

US 49 CFR INFORMATION:

Proper Shipping Name:	Ethanol mixture
UN No.:	UN1170
Hazard Class - Primary:	3
Packing Group:	II
Label Codes:	3
RQ Components:	Silver.
RQ LBS:	1000 lbs
Marine Pollutant:	None.

SPECIAL TRANSPORTATION NOTES: For shipments by ground within the United States, the Limited Quantity exception may apply for containers which hold 1.0 L (0.3 gallons) or less. Under the US 49 CFR, refer to Sections 173.150 for additional exception information, if shipping under this exception.

INTERNATIONAL IATA / ICAO INFORMATION:

Proper Shipping Name:	Ethanol mixture
UN No.:	UN1170
Primary Class(es):	3
Subsidiary Class(es):	None
Packing Group:	II
ICAO EMERGENCY RESPONSE DRILL (ERG) CODE:	3L.

OTHER SHIPPING INFORMATION: This product may be shipped internationally by air, as a 'Limited Quantity'. Combination packaging must be used and the maximum gross weight of the package must not exceed 30 kg (66 lbs). Refer to the appropriate Packing Instruction, including all State and operator variations, for additional requirements.

15. REGULATORY INFORMATION

US INFORMATION:

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

EPA/CERCLA REPORTABLE QUANTITY (RQ): Silver (RQ 1000 lbs.)

SARA TITLE III: *Sec. 313, Toxic Chemicals Notification, 40 CFR 372:* This material may be subject to the TSCA notification requirements, since it contains Silver, a Toxic Chemical constituent above its *de minimus* concentration.

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. This product does contain Ethyl alcohol, which is known to the State of California to cause developmental harm; however, this is only applicable when the chemical is present in alcohol beverages.

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>New Jersey Hazardous Substance</u>
Ethanol	64-17-5	Yes
Silver	7440-22-4	Yes

International Information:

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

CANADIAN WHMIS CLASSIFICATION: Class B2 (Flammable liquids); Class D2A (Materials Causing Other Toxic Effects, Very Toxic Material); Class D2B (Materials Causing Other Toxic Effects, Toxic Material).

16. OTHER INFORMATION

NAME	INGREDIENT	WEIGHT %	CAS NUMBER	INGREDIENT	WEIGHT %	CAS NUMBER
S2-30E	Ethanol	50 - 65	64-17-5	Silver	35 - 50	7440-22-4
S2-80E	Ethanol	25 - 45	64-17-5	Silver	55 - 75	7440-22-4
S2-500E	Ethanol	25 - 45	64-17-5	Silver	55 - 75	7440-22-4

HMI-ES Rating:

0 - Insignificant 1 - Slight 2 - Moderate 3 - High 4 - Extreme

* - Chronic Hazard

Health: *2 Flammability: 3 Reactivity: 0

Legend:

ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
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
IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
N/Ap: not applicable
N/Av: not available
NIOSH: National Institute of Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
RCRA: Resource Conservation and Recovery Act
SARA: Superfund Amendments & Reauthorization Act
TLV: Threshold Limit Values
TSCA: Toxic Substance Control Act
WHMIS: Workplace Hazardous Materials Information System

References:

1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2006.
2. International Agency for Research on Cancer Monographs, 2006.
3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, 2006 (Chempendium, HSDB and RTECs).
4. US EPA Title III List of Lists – January 27, 2005 version.
5. California Proposition 65 List – February 3, 2006 version.

CURRENT ISSUE DATE: 10/5/06

PREVIOUS ISSUE DATE: 8/25/06

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

OTHER INFORMATION: N/Ap