



MATERIAL SAFETY DATA SHEET
NYACOL® ZRYS4

REVISION: 11/22/2010
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1. Chemical Product and Company Identification

Trade Name: NYACOL® ZRYS4 Zirconia Sol
Chemical Name: Zirconium Oxide, Nitric Acid, Yttrium Oxide
Synonyms: None.
Product Code: ZRYS4
Use: Ceramics
Manufacturer: Nyacol Nano Technologies, Inc.
Megunko Road, P.O. Box 349, Ashland, MA 01721 U.S.A.
508-881-2220
Emergency Telephone: CHEMTREC: 1-800-424-9300
E-mail Contact: info@nyacol.com

2. Composition / Information on Ingredients

<u>Component</u>	<u>CAS #</u>	<u>Exposure Limits</u>	<u>Percent By Weight</u>
Zirconium Oxide:	1314-23-4	5mg/M ³ (Zr)	18
Nitric Acid:	7697-38-2	2 ppm	3
Yttrium Oxide:	1314-36-9	1mg/M ³ (Y)	1.3
Water:	7732-18-5	None.	77.7

<u>Component</u>	<u>EINECS #</u>	<u>RTECS #</u>	<u>REACH #</u>
Zirconium Oxide:	215-227-2	ZH8800000	05-2117294598-22-0000
Nitric Acid:	231-714-2	QU5775000	05-2117294590-38-0000
Yttrium Oxide:	215-233-5	ZG3850000	05-2117294609-27-0000
Water:	231-791-2	ZC0110000	None.

3. Hazard Identification

Emergency Overview Translucent white liquid. No odor. Keep spills out of surface waters.

Classification Not harmful
Symbol: Not applicable.
Risk Phrases: Not applicable.
Safety Phrases: Not applicable.

Potential Health Effects / Health Hazard Identification

Acute Exposure:
Eye: Irritation
Skin: Irritation
Ingestion: Not available.
Inhalation: Not available.
Chronic Exposure: Not known.

Other Hazards

Known Synergists: Not available.
Explosion Hazard: Not available.
Fire Hazard: Not available.
Corrosion Hazard: Not available.

4. First Aid Measures

Eye Contact: Flush eyes with large quantities of water. If irritation persists get medical attention.
Skin Contact: Wash well with soap and water.
Ingestion: If swallowed seek medical attention immediately. Do not induce vomiting. Give large quantities of water with Milk of Magnesia or other medical antacid. Never give anything by mouth to an unconscious person.
Inhalation: Remove person from exposure source, consult medical professional.
First Aid Facilities: Eye wash station. Milk of Magnesia or other medical antacid.
Advice to Physicians: None available.



5. Firefighting Measures

Flammability: Will not burn in a fire. Containers can build pressure if exposed to heat or fire.
Extinguishing Media: All are acceptable. Cool containers with water spray.
Protective Equipment: Wear standard full firefighter turn-out gear (full bunker gear) and respiratory protection (SCBA).
Special Exposure Hazard: None known.

6. Accidental Release Measures

Leaks and Spills: Contain spill or leak with sand, clay or absorbents. Recover liquid for recycle or disposal. Do not allow spills into sewers or surface waters. Place absorbents, waste products and contaminated soil into containers for disposal.
Personal Protection: Eye protection and impervious gloves. An approved air-purifying respirator should be worn if dust or mist is present.

7. Handling and Storage

Handling: Avoid generating mist or dust during use.
Storage: Store in cool dry area. Do not freeze.

8. Exposure Controls / Personal Protection

Engineering Control: Use exhaust ventilation to keep airborne concentrations below exposure limits.
Respiratory Protection: When respiratory protection are required or concentrations are unknown, use an approved air-purifying respirator with a dust cartridge.
Skin Protection: Clean body-covering clothing; impervious gloves such as neoprene.
Eye Protection: Wear approved safety glasses.

9. Physical and Chemical Properties

Appearance: Translucent white liquid
Odor: None.
Physical State: Liquid. NYACOL® ZRYS4 is a water-based material.
pH: 5
Boiling Point: 100°C (212°F) water
Freezing Point: 0°C (32°F) water
Flash Point: Not applicable.
Vapor Pressure: 2260 kPs (17 mm Hg) at 20°C water
Oxidizing Properties: Not an oxidizer
Solubility in Water: Soluble in all proportions
Density: 1210 Kg/M³
Specific Gravity: 1.21
Volatile by Weight: 80%
Viscosity: <15 cP
Explosion Limits: Not applicable.
Partition Coefficient: Not applicable.
Evaporation Rate: Slow (Butyl Acetate = 1)

10. Stability and Reactivity

Chemical Stability: Stable.
Conditions To Avoid: Neutralization by basic materials.
Incompatibility With Other Materials: Not available.
Hazardous Decomposition Products: Nitric acid, oxides of nitrogen.
Hazardous Polymerization: Will not occur.



11. Toxicological Information

<u>Material</u>	<u>LD₅₀, Rat, Oral</u>
Zirconium Oxide:	>8800 mg/kg
Nitric Acid:	>90 mL/kg
Yttrium Oxide:	>10,000 mg/kg
Water:	None reported.
Eye Effects:	Not available.
Skin Effects:	Not available.
Inhalation Effects:	Not available.
Ingestion Effects:	Not available.

12. Ecological Information

Ecotoxicity:	Not available.
Persistence:	Not available.

13. Disposal Considerations

Disposal Considerations:	Neutralize with lime or soda ash. Solids should be put in a landfill approved for chemical waste.
United States:	Not a RCRA-regulated waste.

14. Transport Information

<u>Regulations</u>	<u>Shipping Name</u>	<u>Hazard Class</u>	<u>Packing Group</u>	<u>U.N. Number</u>
U.S. D.O.T.:	Not applicable.	Not applicable.	Not applicable.	Not applicable.
ICAO / IATA:	Not applicable.	Not applicable.	Not applicable.	Not applicable.
IMO / IMDG:	Not applicable.	Not applicable.	Not applicable.	Not applicable.
ADR:	Not applicable.	Not applicable.	Not applicable.	Not applicable.

15. Regulatory Information

U.S. Federal Regulations

EPA TSCA Inventory:	All ingredients listed.
SARA Section 313:	This product contains the following toxic chemicals 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:

<u>Chemical Name</u>	<u>CAS #</u>	<u>Percent By Weight</u>
Nitric Acid	7697-37-2	3

D.O.T. Regulations:	See Section 14.
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U.S. State Regulations

California Proposition 65:	No ingredients listed.
State Right-to-Know Laws:	Section 2 of this MSDS lists all components of ZRYS4.

Canadian Regulations

Domestic Substance List:	All ingredients listed.
WHMIS:	Zirconium Oxide: uncontrolled. Nitric Acid: class E. Yttrium Oxide: not listed.

Transportation of Dangerous Goods:	Does not meet dangerous goods criteria.
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Controlled Products Regulations:	This MSDS contains all the information items specified in Schedule 1, Column 3 of the Controlled Products Regulations in a 16-heading format.
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EC Regulations

Classification:	Not harmful.
Symbol:	Not applicable.
Risk Phrases:	Not applicable.
Safety Phrases:	Not applicable.



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16. Other Information

NFPA 704 Hazard Rating: Health – 1, Flammability – 0, Reactivity – 0, Special – None
HMIS® Hazard Rating: Health – 1, Flammability – 0, Reactivity – 0
Protective Equipment – B: Eye Protection, Gloves
Recommended Use: ZRYS4 is recommended for use in ceramics. For industrial use only, not for food, drug or home use.
Work Alert: Workers using ZRYS4 should read and understand this MSDS and be trained in the proper use of this material.
MSDS Prepared By: David L. Catone
Technical Service and Product Development Manager
Nyacol Nano Technologies, Inc.
Telephone: 508-881-2220 U.S.A.
Revision Date: November 22, 2010
Supersedes: May 5, 2009

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