

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
Bldg. 202 Rm. 211
Gaithersburg, Maryland 20899

SRM Number: 3142a
MSDS Number: 3142a
SRM Name: Praseodymium Standard
Solution
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SECTION I. MATERIAL IDENTIFICATION

Material Name: Praseodymium Standard Solution

Description: SRM 3142a is a single element solution prepared gravimetrically to contain a nominal 10 mg/g of praseodymium with a nitric acid volume fraction of 10 %.

Other Designations: Praseodymium in Nitric Acid (aqua fortis; hydrogen nitrate; azotic acid; engravers acid); Praseodymium Nitrate* (nitric acid, praseodymium (+3) salt; praseodymium (III) trinitrate) in Standard Solution

| Name | Chemical Formula | CAS Registry Number |
|----------------------|-----------------------------------|---------------------|
| Nitric Acid | HNO ₃ | 7697-37-2 |
| Praseodymium Nitrate | Pr(NO ₃) ₃ | 10361-80-5 |
| Praseodymium | Pr | 7440-10-0 |

DOT Classification: Nitric Acid, Solution, UN2031

Manufacturer/Supplier: It is available from a number of suppliers.

* The addition of praseodymium to nitric acid, along with other intermediate chemical reactions, forms praseodymium nitrate which will precipitate upon evaporation or drying of the solution.

SECTION II. HAZARDOUS INGREDIENTS

| Hazardous Components | Nominal Concentration (%) | Exposure Limits and Toxicity Data |
|----------------------|---------------------------|--|
| Nitric Acid | 10 | ACGIH TLV-TWA: 2 mg/kg or 5 mg/m ³ OSHA TLV-TWA: 2 mg/kg or 5 mg/m ³ Human, Oral: LD _{LO} : 430 mg/kg |
| Praseodymium Nitrate | 2.3 | No ACGIH TLV-TWA established Rat, Oral: LD ₅₀ : 1859 mg/kg Rat, Intravenous: LD ₅₀ : 5576 µg/kg |
| Praseodymium | 1 | No ACGIH TLV-TWA established |

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

| Nitric Acid | Praseodymium Nitrate | Praseodymium |
|---|--|--|
| Appearance and Odor: a colorless to slightly yellow liquid that darkens to a brownish color upon aging and exposure to light; a pungent odor | Appearance and Odor: light green crystals; odorless | Appearance and Odor: a yellow to gray metal |
| Relative Molecular Mass: 63.02 | Relative Molecular Mass: 326.92 | Relative Atomic Mass: 140.91 |
| Density: 1.05 g/mL (10 % nitric acid) | Density: 2.0 to 3.0 g/mL | Density: 6.64 to 6.77 g/mL |
| Solubility in Water: soluble | Solubility in Water: soluble | Solubility in Water: decomposes |
| Solvent Solubility: decomposes in alcohol | Solvent Solubility: N/A | Solvent Solubility: soluble in dilute acids |

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this praseodymium/nitric acid solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

Method Used: N/A

Autoignition Temperature: N/A

Flammability Limits in Air (Volume %): **UPPER:** N/A

LOWER: N/A

Unusual Fire and Explosion Hazards: Although nitric acid does not burn, it is a powerful oxidizing agent that can react with combustible materials to cause fires. Praseodymium, in dust form, is capable of producing a dust explosion. Praseodymium nitrate is an oxidizer; contact with combustible materials may cause a fire.

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire. Use a water spray to dilute nitric acid and to absorb liberated oxides of nitrogen.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: X Stable _____ Unstable

Conditions to Avoid: Avoid heat, flames, and other sources of ignition. Avoid contact with combustible and other incompatible materials.

Incompatibility (Materials to Avoid): Keep nitric acid away from organic materials, plastics, rubber, and some forms of coatings. Nitric acid is incompatible with chlorine and metal ferrocyanide. Avoid contact with acids, bases, amines, halogens, halocarbons, cyanides, metals, metal oxides, metal salts, metal carbides, peroxides, oxidizing materials, and reducing agents. Praseodymium is incompatible with acids and halogens. Praseodymium nitrate is incompatible with reducing agents.

See Section IV: *Unusual Fire and Explosion Hazards*

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: Notify safety personnel of spills. Surfaces contaminated with spills should be covered with soda ash or sodium bicarbonate to neutralize the acid. Place the neutralized material into containers suitable for eventual disposal, reclamation, or destruction.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Provide general and local explosion proof ventilation systems to maintain airborne concentrations below the TLV. Provide approved respiratory apparatus for non-routine or emergency use. Use an approved filter and vapor respirator when the vapor or mist concentrations are high. Wear gloves and chemical safety glasses where contact with the liquid or high vapor concentrations may occur. An eye wash station and washing facilities should be readily available near handling and use areas. Wash exposed skin areas several times a day with soap and warm water.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them.
DO NOT wear contact lenses in the laboratory.

Store this material at room temperature.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Praseodymium*, 7 December 1999.
MDL Information Systems, Inc., MSDS *Praseodymium Nitrate*, 7 December 1999.
MDL Information Systems, Inc., MSDS *Nitric Acid*, 16 September 1999.
The Merck Index, 11th Ed., 1989.
The Sigma-Aldrich Library of Chemical Safety Data, Ed. II, 1988.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified value for this material is given on the NIST Certificate of Analysis.