1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifier

Chemical Name: Ammonium Cerium(IV) Nitrate

Catalogue #: A633930

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Product Uses: To be used only for scientific research and development. Not for use in humans or animals.

1.3 Details of the Supplier of the Safety Data Sheet

Company: Toronto Research Chemicals
2 Brisbane Road
Toronto, ON M3J 2J8
CANADA

Telephone: +14166659696
FAX: +14166654439
Email: orders@trc-canada.com

1.4 Emergency Telephone Number

Emergency#: +14166659696 between 0800-1700 (GMT-5)

2. HAZARDS IDENTIFICATION

WHMIS Classification (Canada)

C Oxidizer

D2B Toxic Material Causing Other Toxic Effects
   Moderate Skin/Eye/Respiratory Tract Irritant

WHMIS Symbols (Canada)

2.1/2.2 Classification of the Substance or Mixture and Label Elements

GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

- Oxidising Solids (Category 2)
- Skin Irritation (Category 2)
- Serious Eye Irritation (Category 2)
- Specific Target Organ Toxicity, Single Exposure; Respiratory Tract Irritation (Category 3)

EU Classification (According to EU Regulation 67/548/EEC)

Contact with combustible material may cause fire.
Irritating to eyes, respiratory system and skin.

EU Risk and Safety Statements (According to EU Regulation 67/548/EEC)

<table>
<thead>
<tr>
<th>Hazard Statements</th>
<th>Hazard Codes</th>
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</thead>
<tbody>
<tr>
<td>Oxidizing</td>
<td>O</td>
</tr>
<tr>
<td>Irritant</td>
<td>Xi</td>
</tr>
</tbody>
</table>

Risk Codes and Phrases

- R8: Contact with combustible material may cause fire.
- R36/37/38: Irritating to eyes, respiratory system and skin.
**Safety Precaution Codes and Phrases**

S17  Keep away from combustible material.
S24/25 Avoid contact with skin and eyes.
S45  In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).
S36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

**GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)**

**Signal Word** Danger

**GHS Hazard Statements**

H272 May intensify fire; oxidiser.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

**GHS Precautionary Statements**

P220 Keep/Store away from clothing//combustible materials.
P221 Take any precaution to avoid mixing with combustibles…
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P302/P352 IF ON SKIN: Wash with plenty of soap and water
P305/P351/P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**2.3 Unclassified Hazards/Hazards Not Otherwise Classified**

No data available

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**3.1 Substances**

Molecular Formula: \( \text{CeH}_{88}\text{N}_{8}\text{O}_{18} \)  
Molecular Weight: 548.22

CAS Registry #: 16774-21-3  
EC#: 240-827-6

Synonyms

(OC-6-11)-Hexakis(nitrato-κO)-ammonium (1:2) Cerate(2-);
Ammonium Hexanitratocerate(IV); (OC-6-11)-Hexakis(nitrato-O)-diammonium Cerate(2-);
(OC-6-11)-Hexakis(nitrato-κO)-diammonium Cerate(2-); Hexanitrato-diammonium Cerate(2-);
Cerium Diammonium Hexanitrate; Diammonium Cerium Hexanitrate; Diammonium Hexanitratocerate; Diammonium Hexanitratocerate(2-);
NSC 215187; NSC 4313

**3.2 Mixtures**

Not a mixture

**4. FIRST AID MEASURES**

**4.1 Description of First Aid Measures**

**General Advice**
If medical attention is required, show this safety data sheet to the doctor.

**If Inhaled**
If inhaled, move casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

**In Case of Skin Contact**
Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

**In Case of Eye Contact**
Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

**If Swallowed**
Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless
advised to do so by a physician or Poison Control Center. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed
No data available

4.3 Indication of any Immediate Medical Attention and Special Treatment Needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing Media
Suitable Extinguishing Media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special Hazards Arising from the Substance or Mixture
Nitrogen oxides, Cerium oxides

5.3 Advice for Firefighters
Wear self-contained breathing apparatus for fire fighting if necessary.

5.4 Further Information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment and Emergency Procedures
Use recommended personal protective equipment (see Section 8). Prevent the formation of dusts and mists. Adequate ventilation must be provided to ensure dusts or mists are not inhaled.

6.2 Environmental Precautions
Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

6.3 Methods and Materials for Containment and Cleaning Up
Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

For protective equipment, refer to Section 8. For disposal, see Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for Safe Handling
Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of dusts and mists. Normal measures for preventative fire protection. No smoking, eating or drinking around this material. Wash hands after use.

7.2 Conditions for Safe Storage, Including any Incompatibilities
Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Storage conditions: No Data Available

7.3 Specific End Uses
For scientific research and development only. Not for use in humans or animals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control Parameters
Contains no components with established occupational exposure limits.

8.2 Exposure Controls
Appropriate Engineering Controls
A laboratory fume hood or other appropriate form of local exhaust ventilation should be used to avoid exposure.

Personal Protective Equipment
All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.
### Eye/Face Protection
Safety goggles or face shield. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).

### Skin Protection
Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as “chemical resistant” by EU standard EN 374 with the resistance codes corresponding to the anticipated use of the material. Unrated gloves are not recommended.

Suggested gloves: AnsellPro Sol-Vex nitrile gloves style 37-175, 15 mil thickness.
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated “chemical resistant” as per EN 734 with the resistance codes corresponding to the anticipated use of the material.

Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

### Body Protection
Fire resistant (Nomex) coveralls or chemical-resistant bodysuit (laminated Tychem SL or equivalent).

### Respiratory Protection
Recommended respirators are NIOSH-approved N100 or CEN-approved FFP3 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1 Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>A) Appearance</th>
<th>B) Odour</th>
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<table>
<thead>
<tr>
<th>C) Odour Threshold</th>
<th>D) pH</th>
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<tr>
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<table>
<thead>
<tr>
<th>E) Melting Point/Freezing Point</th>
<th>F) Initial Boiling Point/Boiling Range</th>
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</thead>
<tbody>
<tr>
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<td>No data available</td>
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<table>
<thead>
<tr>
<th>G) Flash point</th>
<th>H) Evaporation Rate</th>
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<table>
<thead>
<tr>
<th>I) Flammability (Solid/Gas)</th>
<th>J) Upper/Lower Flammability/Explosive Limits</th>
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</thead>
<tbody>
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<table>
<thead>
<tr>
<th>K) Vapour Pressure</th>
<th>L) Vapour Density</th>
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<table>
<thead>
<tr>
<th>M) Relative Density</th>
<th>N) Solubility</th>
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<table>
<thead>
<tr>
<th>O) Partition Coefficient: n-octanol/water</th>
<th>P) Auto-Ignition Temperature</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Q) Decomposition Temperature</th>
<th>R) Viscosity</th>
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<tbody>
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<td>No data available</td>
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<table>
<thead>
<tr>
<th>S) Explosive Properties</th>
<th>T) Oxidizing Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>No data available</td>
<td>No data available</td>
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</tbody>
</table>

#### 9.2 Other Information
No data available

### 10. STABILITY AND REACTIVITY

#### 10.1 Reactivity
No data available
10.2 Chemical Stability
Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions
No data available

10.4 Conditions to Avoid
Avoid moisture.

10.5 Incompatible Materials
Strong reducing agents.

10.6 Hazardous Decomposition Products
No data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects
A) Acute Toxicity
No data available

B) Skin Corrosion/Irritation
Moderate skin irritant.

C) Serious Eye Damage/Irritation
Moderate eye irritant.

D) Respiratory or Skin Sensitization
No data available

E) Germ Cell Mutagenicity
No data available

F) Carcinogenicity
No data available

G) Reproductive Toxicity/Teratogenicity
No data available

H) Single Target Organ Toxicity - Single Exposure
Moderate respiratory tract irritation.

I) Single Target Organ Toxicity - Repeated Exposure
No data available

J) Aspiration Hazard
No data available

K) Potential Health Effects and Routes of Exposure

  Inhalation
  May be harmful if inhaled. Causes respiratory tract irritation.

  Ingestion
  May be harmful if swallowed.

  Skin
  May be harmful if absorbed through skin. Causes skin irritation.

  Eyes
  Causes eye irritation.

L) Signs and Symptoms of Exposure
No data available

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

M) Additional Information
RTECS: Not listed

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and Degradability
12.3 Bioaccumulative Potential
No data available

12.4 Mobility in Soil
No data available

12.5 Results of PBT and vPvB Assessment
No data available

12.6 Other Adverse Effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
A) Product
Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

B) Contaminated Packaging
Dispose of as above.

C) Other Considerations
Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

14. TRANSPORT INFORMATION

14.1 UN Number

14.2 UN Proper Shipping Name
DOT (US)/IATA:
Nitrates, inorganic, n.o.s. (Ammonium Cerium(IV) Nitrate)

IMDG/ADR/RID:
NITRATES, INORGANIC, N.O.S. (AMMONIUM CERIUM(IV) NITRATE)

14.3 Transport Hazard Class(es)
DOT (US): 5.1  IATA: 5.1  IMDG: 5.1  ADR/RID: 5.1

14.4 Packing Group
DOT (US): II  IATA: II  IMDG: II  ADR/RID: II

14.5 Environmental Hazards
DOT (US): None  IATA: None  IMDG: None  ADR/RID: None

14.6 Special Precautions for User
None

15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture
A) Canada
DSL/NDSL Status: This product or a component of this product is registered on the Canadian DSL/NDSL.

B) United States
TSCA Status: This product or a component is listed on the US EPA TSCA.

C) European Union
ECHA Status: This product or a component is registered with the EU ECHA.

15.2 Chemical Safety Assessment
No data available

16. OTHER INFORMATION

16.1 Revision History
Original Publication Date: 9/11/2014

16.2 List of Abbreviations
LD50  Median lethal dose of a substance required to kill 50% of a test population.
LC50  Medial lethal concentration of a substance required to kill 50% of a test population.
LDLo  Lowest known lethal dose
TDLo  Lowest known toxic dose
16.3 Further Information

Copyright 2013. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.