Section 1 - Product and Company Information

Product Name                  TRIMETHYL ALUMINUM FOR CAMBRIDGE NANOTECH INC ALD SYSTEMS
Product Number                663301
Brand                         ALDRICH
Company                       Sigma-Aldrich
Address                       3050 Spruce Street
                               SAINT LOUIS MO 63103 US
Technical Phone:              800-325-5832
Fax:                          800-325-5052
Emergency Phone:             314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name                CAS #       SARA 313
TRIMETHYL ALUMINUM            75-24-1     No

Formula                      C3H9Al
Synonyms                     Trimethylalane * Trimethylaluminium *
                               Trimethylaluminum
RTECS Number:                BD2204000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Pyrophoric (USA) Highly Flammable (EU). Corrosive.
Reacts violently with water. Spontaneously flammable in air.
Causes burns.

HMIS RATING
HEALTH: 3
FLAMMABILITY: 4
REACTIVITY: 4
SPECIAL HAZARD(S): Water reactive

NFPA RATING
HEALTH: 3
FLAMMABILITY: 4
REACTIVITY: 4
SPECIAL HAZARD(S): Water reactive

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give
artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS
Flammable Hazards: Yes
Pyrophoric/Autoignition: Yes

EXPLOSION HAZARDS
Forms explosive mixtures in air.

CONDITIONS OF FLAMMABILITY
Reacts with water to liberate flammable and/or explosive gas. Catches fire if exposed to air.

FLASH POINT
1.4 °F   - 17.0 °C   Method: closed cup

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Dry chemical powder.
Unsuitable: Do not use water.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Pyrophoric material. Emits toxic fumes under fire conditions. Water reactive material.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage
HANDLING
User Exposure: Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Keep away from combustible materials, heat, sparks, and open flame. Store in a cool dry place. Handle and store under nitrogen.
Incompatible Materials: Do not allow contact with water

SPECIAL REQUIREMENTS
Handle and store under inert gas. Air sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath. Use nonsparking tools.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Hand: Compatible chemical-resistant gloves. Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS
Country Source Type Value
USA ACGIH TWA 2 MG(AL)/M3
New Zealand OEL
Remarks: check ACGIH TLV

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Physical State: Liquid</td>
<td></td>
</tr>
<tr>
<td>Property</td>
<td>Value</td>
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<tr>
<td>Molecular Weight</td>
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<tr>
<td>pH</td>
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<td>760 mmHg</td>
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<td>MP/MP Range</td>
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<td>60 °C</td>
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<td>Volatile%</td>
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<tr>
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<tr>
<td>Solvent Content</td>
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<tr>
<td>Evaporation Rate</td>
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</tr>
</tbody>
</table>
Viscosity               N/A
Surface Tension         N/A
Partition Coefficient   N/A
Decomposition Temp.     N/A
Flash Point             1.4 °F - 17.0 °C    Method: closed cup
Explosion Limits        N/A
Flammability            N/A
Autoignition Temp       N/A
Refractive Index        N/A
Optical Rotation        N/A
Miscellaneous Data      N/A
Solubility              N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Unstable.
Conditions to Avoid: Catches fire if exposed to air. Do not allow water to enter container because of violent reaction.
Materials to Avoid: Acids, Oxygen, Alcohols, Halogens, Oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Aluminum oxide Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Section 12 - Ecological Information

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.
Section 14 - Transport Information

DOT
Proper Shipping Name: Aluminum alkyls
UN#: 3051
Class: 4.2
Packing Group: Packing Group I
Hazard Label: Spontaneously combustible
PIH: Not PIH

IATA
Proper Shipping Name: Aluminium alkyls
IATA UN Number: 3051
Hazard Class: 4.2
Packing Group: I
Not Allowed - Aircraft: Not permitted for air transport.

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: F-C
R: 14-17-34
Risk Statements: Reacts violently with water. Spontaneously flammable in air. Causes burns.
S: 16-43-45
Safety Statements: Keep away from sources of ignition - no smoking. In case of fire, use dry powder. Never use water. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT
Risk Statements: Reacts violently with water. Spontaneously flammable in air. Causes burns.
Safety Statements: Keep away from sources of ignition - no smoking. In case of fire, use dry powder. Never use water. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our
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