SAFETY DATA SHEET

Aluminum Oxide Spent Catalyst

Version 2.0
Revision Date 2013/07/10

This SDS adheres to the standards and regulatory requirements of China and may not meet the regulatory requirements in other countries.

Section 1 - Chemical and Enterprise Identification

Chinese name : Aluminum Oxide Spent Catalyst
Product name in English : Aluminum Oxide Spent Catalyst

Manufacturer or supplier's details
Company : Du Pont China Holding Co., Ltd
Street address : China, Shanghai, 399 KeYuan Road, Bldg 11, Zhangjiang Hi-Tech Park, Pudong New District 201203

Telephone : 86 21 3862 2888
Telefax : 86 21 3862 2889

Emergency telephone number : 86 532 8388 9090

Recommended use of the chemical and restriction on use
Recommended use : For Manufacturing or Formulating use Only

Section 2 - Hazard Identification

GHS Hazard Category

- Acute toxicity (Oral) : Category 3
- Acute toxicity (Inhalation) : Category 1
- Acute toxicity (Dermal) : Category 1
- Skin corrosion : Category 1A
- Serious eye damage/eye irritation : Category 1
- Specific target organ toxicity - single exposure : Category 1
- Specific target organ toxicity - single exposure : Category 3
- Specific target organ toxicity - repeated exposure : Category 1

GHS Label Elements

Pictogram :

Signal word : Danger

Hazardous warnings : Toxic if swallowed.
Fatal in contact with skin.
Causes severe skin burns and eye damage.
Fatal if inhaled.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Causes damage to organs. (Respiratory system)
Causes damage to organs through prolonged or repeated exposure. (Inhalation: Lung, Bone, Tooth, Kidney, Respiratory system)

Hazardous prevention measures:
- Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
- Do not get in eyes, on skin, or on clothing.
- Wash skin thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/ protective clothing/ eye protection/ face protection.
- Wear respiratory protection.
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
- IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
- IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing.
- Rinse skin with water/ shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
- Specific treatment is urgent (see supplemental first aid instructions on this label).
- Remove/Take off immediately all contaminated clothing.
- Wash contaminated clothing before reuse.
- Store in a well-ventilated place. Keep container tightly closed.
- Store locked up.
- Dispose of contents/ container to an approved waste disposal plant.

Main Symptom and Emergency Summary After Contact
No information available.

Section 3 - Ingredients/Composition Information

Chemical nature: Mixture

Components

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum fluoride</td>
<td>7784-18-1</td>
<td>50 - 90%</td>
</tr>
<tr>
<td>Aluminum oxide</td>
<td>1344-28-1</td>
<td>10 - 50%</td>
</tr>
<tr>
<td>Hydrogen fluoride</td>
<td>7664-39-3</td>
<td>0 - 15%</td>
</tr>
<tr>
<td>Carbon</td>
<td>7440-44-0</td>
<td>0 - 1%</td>
</tr>
</tbody>
</table>

Section 4 - First-aid Measures

Inhalation:
- Remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, call a physician.

Skin contact:
- Wash off immediately and with plenty of water while removing all contaminated
clothes and shoes. Keep patient warm and at rest. First treatment with calcium gluconate paste. Immediately apply calcium gluconate gel 2.5% and massage into the affected area using rubber gloves; continue to massage while repeatedly applying gel until 15 minutes after pain is relieved. Apply water longer (15 minutes) if calcium gluconate is not available. If finger/finger nails are touched, even if there is no pain, dip them in a bath of 5% calcium gluconate for 15 to 20 minutes. Consult a physician immediately in all cases of skin contact no matter how minor.

Eye contact : Rinse immediately with plenty of water, also under the eyelids. Remove contact lenses. Flush eyes with water at least 15 minutes. Get medical attention if eye irritation develops or persists.

Ingestion : Rinse mouth with water. If swallowed, DO NOT induce vomiting unless directed to do so by medical personnel. If symptoms persist, call a physician.

Most important symptoms/effects, acute and delayed : No information available.

Protection of first-aiders : No information available.

Notes to physician : No information available.

Section 5 - Fire-fighting Measures

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards : This product is not considered a fire hazard.

Specific fire fighting methods and special protective equipment for fire fighters : Wear a positive-pressure supplied-air respirator with full facepiece. Wear suitable protective equipment. Hydrogen fluoride or hydrogen chloride fumes emitted during a fire can react with water to form hydrofluoric acid or hydrochloric acid.

Section 6 - Leak Emergency Treatment

Protective measures, devices and emergency treatment procedure for workers : Evacuate personnel to safe areas. Wear suitable protective equipment.

Environmental protection measures : Prevent material from entering sewers, waterways, or low areas.

Collection of leaking materials, removal method and materials used for disposal : No information available.
Prevention of secondary hazards: No information available.

Section 7 - Operation Handling and Storage

Operation Handling
Technical measures/Precautions: Avoid dust formation. Remove personal protective equipment immediately after handling this product. Wash hands before eating, drinking, or smoking. Remove and wash contaminated clothing before re-use.

Precautions for safe handling: No information available.

Hygiene measures: No information available.

Storage
Suitable storage conditions: Keep containers tightly closed and in an upright position. Keep in a dry, cool and well-ventilated place. Keep away from direct sunlight. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Section 8 - Exposure Control and Personal Protection

Engineering controls: Ensure adequate ventilation.

Occupational Exposure Limits

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Occupational Exposure Limits</th>
<th>Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum oxide</td>
<td>TWA 10 mg/m³</td>
<td>US. ACGIH Threshold Limit Values</td>
</tr>
<tr>
<td></td>
<td>TWA 4 mg/m³ (Total dust.)</td>
<td>Occupational Exposure Limit for Hazardous Agents in the Workplace</td>
</tr>
<tr>
<td></td>
<td>TWA 1 mg/m³ (Respirable fraction.)</td>
<td>US. ACGIH Threshold Limit Values</td>
</tr>
<tr>
<td>Aluminum fluoride (as F)</td>
<td>TWA 2 mg/m³</td>
<td>Occupational Exposure Limit for Hazardous Agents in the Workplace</td>
</tr>
<tr>
<td>(as F)</td>
<td>TWA 2.5 mg/m³</td>
<td>US. ACGIH Threshold Limit Values</td>
</tr>
<tr>
<td></td>
<td>TWA 1 mg/m³ (Respirable fraction.)</td>
<td>US. ACGIH Threshold Limit Values</td>
</tr>
<tr>
<td>Hydrofluoric acid...% (as F)</td>
<td>TLV-C 2 mg/m³</td>
<td>Occupational Exposure Limit for Hazardous Agents in the Workplace</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th></th>
<th>TWA</th>
<th>US. ACGIH Threshold Limit Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>(as F)</td>
<td>0.5 ppm</td>
<td></td>
</tr>
<tr>
<td>(as F)</td>
<td>TLV-C</td>
<td>2 ppm</td>
</tr>
<tr>
<td>(SKIN)</td>
<td></td>
<td>US. ACGIH Threshold Limit Values</td>
</tr>
<tr>
<td>Carbon</td>
<td>TWA</td>
<td>2 mg/m³ (Respirable fraction.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>US. ACGIH Threshold Limit Values</td>
</tr>
</tbody>
</table>

Biological occupational exposure limits: No information available.

Personal protective equipment

Respiratory protection: In case of dust exposure wear suitable personal respiratory protection and protective suit.

Hand protection: Material: Rubber gloves

Eye protection: No information available.

Skin protection: Where there is potential for skin contact have available and wear as appropriate: Hydrofluoric acid-resistant protective suit and boots, Impervious butyl rubber gloves

Section 9 - Physical and Chemical Properties

Appearance (Physical state, form, colour, etc.)

Physical state: solid
Form: solid
Colour: light grey, to, dark grey, or, black
Odour: odourless
pH (specified concentration): not applicable

Melting point/freezing point

no data available

Boiling point, initial boiling point and boiling range

no data available

Flash point: no data available
Decomposition temperature: no data available
Auto-ignition temperature: no data available
Explosion limits
- Upper explosion limit: no data available
- Lower explosion limit: no data available

Vapour pressure: no data available

Vapour density: no data available

Density: no data available

Solubility(ies)
- Water solubility: no data available
- Solubility in other solvents: no data available

Partition coefficient: n-octanol/water: no data available

Section 10 - Stability and Reactivity
- Stability: Stable
- Possible hazardous reactions under specific conditions: No information available.
- Conditions to avoid: No information available.
- Materials to avoid: No information available.
- Hazardous decomposition products: No hazardous decomposition products are known.

Section 11 - Toxicological Information
Acute toxicity:

Aluminum fluoride:
- Oral: LD50/rat: > 2,000 mg/kg
- Inhalation: Acute toxicity estimate: > 10.1 mg/l
  Dust: An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

Aluminum oxide:
- Oral: LD50/rat: > 15,900 mg/kg
  Method: OECD Test Guideline 401
- Inhalation: LC50/4 h/rat: 2.1 mg/l
  Method: OECD Test Guideline 403
  Respiratory tract irritation
  Target Organs: Respiratory Tract

Hydrogen fluoride:
- Oral: LD50/rat: 31 mg/kg
  Information given is based on data obtained from similar substances.
- Inhalation: LC50/4 h/rat: 0.535 mg/l
  Vapour: Fluid retention in lungs (pulmonary oedema)
  Target Organs: Lungs
    LC50/4 h/rat: 0.535 mg/l
- Vapour: Fluid retention in lungs (pulmonary oedema)
  LC50/4 h/rat: 204 ppm
gas
- Dermal: Acute toxicity estimate: > 5 mg/kg

Carbon:
- Oral: LD50/rat: > 2,000 mg/kg
  Method: OECD Test Guideline 423

Skin corrosion/irritation:

Aluminum fluoride:
- Species: rabbit
- Classification: Not classified as irritant
- Result: No skin irritation
  Method: OECD Test Guideline 404

Aluminum oxide:
- Species: rabbit
- Classification: Not classified as irritant
- Result: No skin irritation
  Method: OECD Test Guideline 404
Hydrogen fluoride:
Species: rabbit
Classification: Causes severe burns.
Result: Corrosive
Method: OECD Test Guideline 404

Carbon:
Species: rabbit
Classification: Not classified as irritant
Result: No skin irritation
Method: OECD Test Guideline 404

Eye irritation/corrosion:
Aluminum fluoride:
Species: rabbit
Classification: Not classified as irritant
Result: No eye irritation
Method: OECD Test Guideline 405
slight irritation

Aluminum oxide:
Species: rabbit
Classification: Not classified as irritant
Result: No eye irritation
Method: OECD Test Guideline 405
slight irritation

Hydrogen fluoride:
Species: rabbit
Classification: Causes severe burns.
Result: Corrosive
Method: OECD Test Guideline 405

Carbon:
Species: rabbit
Classification: Irritating to eyes.
Result: Mild eye irritation
Method: OECD Test Guideline 405

Respiratory or skin sensitisation:
Aluminum fluoride:
Local lymph node test
Species: mouse
Classification: Does not cause skin sensitisation.
Result: Does not cause skin sensitisation.
Method: OECD Test Guideline 429

Aluminum oxide:
Species: mouse
Classification: Does not cause respiratory sensitisation.
Result: Does not cause respiratory sensitisation.

Maximisation Test
Species: guinea pig
Classification: Does not cause skin sensitisation.
Result: Does not cause skin sensitisation.
Method: OECD Test Guideline 406

Hydrogen fluoride:
Species: Not tested on animals
Classification: Does not cause skin sensitisation.
Result: Does not cause skin sensitisation.
Not expected to cause sensitization based on expert review of the properties of the substance.

Species: mouse
Classification: Does not cause respiratory sensitisation.
Result: Does not cause respiratory sensitisation.

Carbon:
Local lymph node test
Species: mouse
Classification: Does not cause skin sensitisation.
Result: Does not cause skin sensitisation.
Method: OECD Test Guideline 429

Germ cell mutagenicity:
Aluminum fluoride:
Did not cause genetic damage in cultured bacterial cells.

Aluminum oxide:
Did not cause genetic damage in cultured bacterial cells. Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others. Genetic damage in animals was observed in some laboratory tests but not in others.

Hydrogen fluoride:
Animal testing did not show any mutagenic effects. Did not cause genetic damage in cultured bacterial cells. Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others. Information given is based on data obtained from similar substances.

Carbon:
Evidence suggests this substance does not cause genetic damage in animals. Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Overall weight of evidence indicates that the substance is not carcinogenic.

Hydrogen fluoride:

Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.

Toxicity for reproduction:

Aluminum fluoride:

Animal testing showed effects on reproduction at levels equal to or above those causing parental toxicity. Information given is based on data obtained from similar substances.

Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity. Information given is based on data obtained from similar substances.

Aluminum oxide:

Animal testing showed no reproductive toxicity.
Animal testing showed no developmental toxicity.

Hydrogen fluoride:

Animal testing showed no reproductive toxicity. Information given is based on data obtained from similar substances.
Animal testing showed no developmental toxicity. Information given is based on data obtained from similar substances.

Specific Target Organs Toxicity (Single/Repeated):

Refer to acute toxicity and/or repeated dose toxicity data for more information on target organs if applicable.

Aspiration hazard:

no data available

Other:

Repeted dose toxicity: Inhalation, rat
Respiratory tract irritation, Information given is based on data obtained from similar substances.
Repeted dose toxicity: Oral, dog
No toxicologically significant effects were found., Information given is based on data obtained from similar substances.

Aluminum oxide:

Repeted dose toxicity: Inhalation, rat
Fibrosis
Target Organs: Lungs
Repeted dose toxicity: Oral, rat
No toxicologically significant effects were found.

Hydrogen fluoride:
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Repeated dose toxicity: Oral, multiple species
Changes in teeth, Information given is based on data obtained from similar substances.
Target Organs: Teeth

Repeated dose toxicity: Inhalation, rat
Changes in teeth, Information given is based on data obtained from similar substances.
Target Organs: Teeth

Carbon:

Repeated dose toxicity: Inhalation, multiple species
Respiratory tract irritation

Section 12 - Ecological Information

Ecotoxicity effects

Toxicity to fish

: Aluminum fluoride:
  
  Aquatic toxicity is unlikely due to low solubility.

Hydrogen fluoride:

LC50/96 h/Oncorhynchus mykiss (rainbow trout): 51 mg/l
Information given is based on data obtained from similar substances.
NOEC/21 d/Oncorhynchus mykiss (rainbow trout): 4 mg/l

Other

: Aluminum fluoride:

Hydrogen fluoride:

EbC50/96 h/Selenastrum capricornutum (green algae): 122 mg/l
EC50/48 h/Daphnia magna (Water flea): 97 mg/l
NOEC/21 d/Daphnia magna (Water flea): 3.7 mg/l

Persistence and degradation

: Carbon:
  
  The methods for determining biodegradability are not applicable to inorganic substances.

Bioaccumulation

: Hydrogen fluoride:
  
  The product may be accumulated in organisms.
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Carbon:

Bioaccumulation is unlikely.

Mobility in soil : no data available

Other adverse effects : no data available

Section 13 - Waste Disposal

Waste disposal methods : In accordance with local and national regulations.
Used package: Refer to applicable Local, State/Provincial, and Federal Regulations, as well as industry Standards.

Section 14 - Transport Information

Not classified as dangerous in the meaning of transport regulations.

Section 15 - Regulatory Information

Regulations on the Control over the Safety of Dangerous Chemicals
Production Safety Law of the People's Republic of China
Law of the People's Republic of China on Prevention and Treatment of Occupational Disease
Environmental Protection Law of the People's Republic of China
Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution
Marine Environment Protection Law of the People's Republic of China
Fire Protection Law of the People's Republic of China
Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Wastes
Occupational exposure limits for hazardous agents in the workplace Part 1 Chemical hazardous agents (GBZ2.1)
Occupational exposure limits for hazardous agents in the workplace Part 2 Physical agents (GBZ2.2)
General rule for classification and hazard communication of chemicals (GB13690)
National Hazardous Waste Inventory

Section 16 - Other Information

References : not applicable

Other information : Before use read DuPont's safety information. For further information contact the local DuPont office or DuPont's nominated distributors. ® DuPont's registered trademark

Significant change from previous version is denoted with a double bar.

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