1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name: Scandium, powder, 99.9% trace rare earth metals basis
Brand: SAM
CAS-No.: 7440-20-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Stanford Advanced Materials
23661 Birtcher Dr.
Lake Forest, CA 92630
USA
Telephone: +1 (949) 407-8904
Fax: +1 (949) 812-6690

1.4 Emergency telephone number

Emergency Phone #: +1 (949) 407-8904

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable solids (Category 1), H228

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger
Hazard statement(s)
H228 Flammable solid.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P280 Wear protective gloves/ eye protection/ face protection.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none
3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Formula</th>
<th>Molecular weight</th>
<th>CAS-No.</th>
<th>EC-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sc</td>
<td>44.96 g/mol</td>
<td>7440-20-2</td>
<td>231-129-2</td>
</tr>
</tbody>
</table>

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scandium</td>
<td>Flam. Sol. 1; H228</td>
<td>90 - 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.
For personal protection see section 8.
6.2 **Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 **Methods and materials for containment and cleaning up**
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 **Reference to other sections**
For disposal see section 13.

7. **HANDLING AND STORAGE**

7.1 **Precautions for safe handling**
Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**
Keep container tightly closed in a dry and well-ventilated place. Keep in a dry place.

7.3 **Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

8. **EXPOSURE CONTROLS/PERSOAL PROTECTION**

8.1 **Control parameters**

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 **Exposure controls**

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Personal protective equipment**

**Eye/face protection**
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

<table>
<thead>
<tr>
<th>Full contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material: Nitrile rubber</td>
</tr>
<tr>
<td>Minimum layer thickness: 0.11 mm</td>
</tr>
<tr>
<td>Break through time: 480 min</td>
</tr>
<tr>
<td>Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Splash contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material: Nitrile rubber</td>
</tr>
<tr>
<td>Minimum layer thickness: 0.11 mm</td>
</tr>
<tr>
<td>Break through time: 480 min</td>
</tr>
<tr>
<td>Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)</td>
</tr>
</tbody>
</table>

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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9. **PHYSICAL AND CHEMICAL PROPERTIES**

9.1 **Information on basic physical and chemical properties**

- **a) Appearance** Form: powder
  Colour: grey
- **b) Odour** No data available
- **c) Odour Threshold** No data available
- **d) pH** No data available
- **e) Melting point/freezing point** Melting point/range: 1,540 °C (2,804 °F) - lit.
- **f) Initial boiling point and boiling range** 2,836 °C (5,137 °F) - lit.
- **g) Flash point** Not applicable
- **h) Evaporation rate** No data available
- **i) Flammability (solid, gas)** The substance or mixture is a flammable solid with the category 1.
- **j) Upper/lower flammability or explosive limits** No data available
- **k) Vapour pressure** No data available
- **I) Vapour density** No data available
- **m) Relative density** 2.99 g/cm3 at 25 °C (77 °F)
- **n) Water solubility** No data available
- **o) Partition coefficient: n-octanol/water** No data available
- **p) Auto-ignition temperature** No data available
- **q) Decomposition temperature** No data available
- **r) Viscosity** No data available
- **s) Explosive properties** No data available
- **t) Oxidizing properties** No data available

9.2 **Other safety 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
Heat, flames and sparks.

10.5 Incompatible materials
Halogens, Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Scandium oxide
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

   Acute toxicity
   No data available
   Inhalation: No data available
   Dermal: No data available
   No data available

   Skin corrosion/irritation
   No data available

   Serious eye damage/eye irritation
   No data available

   Respiratory or skin sensitisation
   No data available

   Germ cell mutagenicity
   No data available

   Carcinogenicity
   IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
   ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
   NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
   OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

   Reproductive toxicity
   No data available
   No data available

   Specific target organ toxicity - single exposure
   No data available

   Specific target organ toxicity - repeated exposure
   No data available
Aspiration hazard
No data available

Additional Information
RTECS: Not available

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

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3089   Class: 4.1   Packing group: II
Proper shipping name: Metal powders, flammable, n.o.s.
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3089   Class: 4.1   Packing group: II
Proper shipping name: METAL POWDER, FLAMMABLE, N.O.S.
EMS-No: F-G, S-G

IATA
UN number: 3089   Class: 4.1   Packing group: II
Proper shipping name: Metal powder, flammable, n.o.s.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.
<table>
<thead>
<tr>
<th>Pennsylvania Right To Know Components</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scandium</td>
<td>7440-20-2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New Jersey Right To Know Components</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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<td>Scandium</td>
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<table>
<thead>
<tr>
<th>California Prop. 65 Components</th>
<th></th>
<th></th>
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<tbody>
<tr>
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<td>7440-20-2</td>
<td></td>
</tr>
</tbody>
</table>

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

### 16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

<table>
<thead>
<tr>
<th>Flam. Sol.</th>
<th>Flammable solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>H228</td>
<td>Flammable solid.</td>
</tr>
</tbody>
</table>

**HMIS Rating**

- Health hazard: 0
- Chronic Health Hazard: 
- Flammability: 3
- Physical Hazard: 3

**NFPA Rating**

- Health hazard: 0
- Fire Hazard: 3
- Reactivity Hazard: 3

**Further information**

This material safety data sheet is offered solely for your information, consideration, and investigation. Stanford Advanced Materials provides no warranties, either express or implied, and assumes no responsibility for the accuracy or completeness of the data contained herein.