Material Safety Data Sheet

1. Product and Company Identification

Product Name: Ozone treatment-catalyst  638-65232
Manufacturer: Shimadzu Corporation
Address: 1 Nishino-kyo Kuwabara-cho Nakagyo-ku
Kyoto 604-8511 Japan
Tel +81-75-823-1635
FAX +81-75-823-4614

2. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>WL%</th>
<th>CAS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron oxide</td>
<td>57</td>
<td>1309-37-1</td>
</tr>
<tr>
<td>Manganese oxide</td>
<td>22</td>
<td>1317-35-7</td>
</tr>
</tbody>
</table>

3. Hazards Identification

Emergency overview
Physical appearance: Black solid
Immediate concerns: Harmful if swallowed or inhaled. Affects central nervous system, blood, and kidneys. May cause irritation to skin, eyes, and respiratory tract.

Potential health effects
Eyes: May cause irritation, redness, and pain.
Skin: May cause irritation with redness and pain. Small particles embedded into the skin can cause localized inflammatory reactions.
Ingestion: May cause abdominal pain and nausea. Although they are poorly absorbed through the intestines, manganic manganese salts may produce hypoglycemia and decreased calcium blood levels should absorption occur.
Inhalation: May cause irritation to the respiratory tract. Inhalation can cause a flu-like illness (metal fume fever). This 24- to 48-hour illness is characterized by chills, fever, aching muscles, dryness in the mouth and throat, and headache. May cause pleuritis and/or severe or fatal pneumonia.
Chronic exposure: Chronic manganese poisoning can result from excessive inhalation and ingestion exposure and involves impairment of the central nervous system. Early symptoms include sluggishness, sleepiness, and weakness in the legs. Advanced cases have shown fixed facial expression, emotional disturbances, spastic gait, and falling. Illness closely resembles Parkinson’s Disease. Kidney effects, blood changes, and manganese psychosis also may occur as a result of chronic exposure. Chronic inhalation exposure can cause lung damage.
4. First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Skin: Wash exposed area with soap and water. Get medical advice if irritation develops.

Ingestion: Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Inhalation: Remove to fresh air. Get medical attention for any breathing difficulty.

5. Fire Fighting Measures

Extinguishing media: Use extinguishing agent applicable to surrounding fire.

Explosion hazards: Material is not flammable.

Firefighting Procedures: As in any fire, wear self-contained breathing apparatus operated in pressure-demand mode, and full protective gear.

6. Accidental Release Measures

Small Spill: With shovel or scoop, place material into clean, dry container; move containers from spill area. Minimize airborne particulates. Protect against inhalation of dusts. Wear gloves and long sleeves. Avoid contact with skin. Use eye protection.

Large Spill: Vacuuming and/or wet methods of cleanup are preferred. Keep airborne particulates to a minimum. Protect against inhalation of dusts or fumes. Wear eye protection. Place in appropriate containers for disposal.

7. Handling and Storage

Handling: Handle with care to avoid contact with eye, skin. Keep away from sources of heat and flame. Use vacuum or wet mop to clean up dust.

Storage: Avoid storing the products at wet places.

8. Exposure Controls / Personal Protection

Exposure guidelines:
OSHA hazardous components (29CFR 1910.1200)

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<thead>
<tr>
<th></th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>ppm</td>
<td>mg/m³</td>
<td>mg/m³</td>
</tr>
<tr>
<td>Iron oxide</td>
<td>TWA</td>
<td></td>
</tr>
<tr>
<td>Manganese oxide</td>
<td>10</td>
<td>5</td>
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<tr>
<td></td>
<td>5</td>
<td>0.2</td>
</tr>
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</table>

Personal protective equipment

Respiratory protection: Wear a respirator if dust is highly concentrated.

Eye protection: Wear safety glasses to prevent eye contact with particles may be used.
9. Physical and Chemical Properties

Appearance: Black solid
Odour: None
Melting point: Not determined
Flash point: Not applicable
Solubility in water: Insoluble
Density: 0.27～0.37kg/L(bulk)

10. Stability and Reactivity

Hazardous polymerization: Will not occur.
Hazardous decomposition products: Oxide of manganese may form when heated.

11. Toxicological Information

No data available

12. Ecological Information

No data available

13. Disposal Considerations

Disposal method: Dispose of this product in accordance with applicable local, state and federal regulations. Recover metal components by reprocessing whenever possible.

14. Transport Information

DOT (Department Of Transportation)
UN No.: None
Proper shipping name: Not regulated

15. Regulatory Information

Follow all regulations in your country
16. Other Information

The information herein is given in good faith, but no warranty, express or implied, is made. This material may present unknown hazards and should be used in caution.

7th, December 2012