Safety Data Sheet (SDS)

Pyrolusite Ore for Ferro-Manganese Alloy Manufacturing

1. Identification

Product Identifier: Pyrolusite Ore for Ferro-Manganese Alloy Manufacturing **Other Means of Identification:** Manganese Dioxide Ore, Natural Manganese Ore **Recommended Use:** Manganese source in metallurgical smelting processes, particularly for ferro-manganese alloy production. **Restrictions on Use:** Not for human consumption.

Supplier Details: Company Name: BTLnewmaterial **Address:** Room 706, No. 154, Wuyi East Road, Niezhou Residential Committee, Caizichi Sub-district Office, Leiyang City, Hengyang City, Hunan Province, China **Email:** lixifirm@outlook.com **Phone/WhatsApp:** +8618273793022 **Website:** manganesesupply.com

Emergency Phone Number: +8618273793022 (General Business Hours)

2. Hazard(s) Identification

GHS Classification: Acute toxicity (oral, dermal, inhalation), category 4

Label Elements: Signal Word: Warning **Pictograms:** GHS07 (Exclamation Mark)

Hazard Statements: H302: Harmful if swallowed. H332: Harmful if inhaled.

Precautionary Statements: Prevention: P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P264: Wash skin thoroughly after handling. P270: Do not eat, drink or smoke when using this product. P271: Use only outdoors or in a well-ventilated area. **Response:** P301 + P312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P312: Call a POISON

CENTER or doctor/physician if you feel unwell. P330: Rinse mouth. **Disposal:** P501: Dispose of contents and container to an approved waste disposal plant.

Other Hazards: (To be determined via search)

3. Composition/Information on Ingredients

Chemical Name	Common Name(s)	CAS Number	Concentration (wt%)
Manganese Dioxide	Pyrolusite	1313-13-9	75-90% (as MnO_2)
Manganese	-	7439-96-5	45-63% (as Mn)
Other minerals	-	-	Balance

4. First-Aid Measures

Description of Necessary First-Aid Measures: Inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If symptoms persist, call a POISON CENTER or doctor/physician. **Skin Contact:** Wash skin thoroughly with soap and water. If skin irritation occurs, get medical advice/attention. **Eye Contact:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. **Ingestion:** Rinse mouth. Call a POISON CENTER or doctor/physician if you feel unwell. Never give anything by mouth to an unconscious person.

Most Important Symptoms/Effects, Acute and Delayed: Harmful if swallowed. Harmful if inhaled. May cause respiratory irritation. Prolonged or repeated exposure to manganese dust may affect the central nervous system.

Indication of Immediate Medical Attention and Special Treatment Needed: Treat symptomatically. In case of doubt or if symptoms persist, seek medical attention.

5. Fire-Fighting Measures

Suitable Extinguishing Media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Product is not flammable. Use appropriate media for adjacent fire.

Specific Hazards Arising from the Chemical: Not combustible but enhances combustion of other substances. Releases oxygen on heating, increasing the burning

rate of any material. May emit toxic fumes when heated to decomposition. Reacts with hydrochloric acid to form corrosive chlorine gas. Heating or rubbing with organic materials can cause fire hazard.

Special Protective Equipment and Precautions for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. Accidental Release Measures

Personal Precautions, Protective Equipment, and Emergency Procedures: Wear protective equipment. Ensure adequate ventilation. Avoid dust formation. Avoid contact with skin, eyes, and clothing. Evacuate personnel to safe areas. Isolate spill or leak area immediately for at least 50 to 100 meters (150 to 330 feet) in all directions.

Environmental Precautions: Do not allow product to enter drains, sewers, or watercourses. If contamination of waterways or sewers occurs, inform appropriate authorities.

Methods and Materials for Containment and Cleaning Up: Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal. Refer to Section 13 for disposal considerations.

7. Handling and Storage

Precautions for Safe Handling: Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with skin and eyes. Ensure adequate ventilation. Wash face, hands, and any exposed skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Use only in well-ventilated areas.

Conditions for Safe Storage, Including Any Incompatibilities:

- Store in a cool, dry, and well-ventilated area.
- Keep container closed when not in use.
- Store away from strong acids, reducing agents, and organic or combustible materials to prevent hazardous reactions.
- Store at ambient temperatures. Unlimited shelf life in tightly closed container in a dry and well-ventilated place.

- Prevent it from staining other specimens.

8. Exposure Controls/Personal Protection

Control Parameters (Exposure Limits): OSHA PEL (as Mn): 5 mg/m³ (Time-Weighted Average, TWA) **NIOSH REL (as Mn):** 1 mg/m³ (TWA, 10-hour workshift); 3 mg/m³ (Short-Term Exposure Limit, STEL, not to be exceeded during any 5-minute work period) **ACGIH TLV (as Mn, respirable fraction):** 0.02 mg/m³ (TWA); (as Mn, inhalable fraction): 0.1 mg/m³ (TWA); A4 (not classifiable as a human carcinogen)

Appropriate Engineering Controls: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. Ensure good ventilation of the work station. Enclosed conveying systems and localized exhaust ventilation to prevent dust from becoming airborne.

Individual Protection Measures (Personal Protective Equipment - PPE): Eye/Face Protection: Safety goggles or glasses, or appropriate eye protection. Face shield. **Skin Protection:** Protective gloves. Wash hands and exposed skin before breaks and immediately after handling the product. **Body Protection:** Wear suitable protective clothing to prevent skin contact. **Respiratory Protection:** In case of insufficient ventilation, wear suitable respiratory equipment. Use NIOSH-approved dust mask or respirator, especially if dust levels are high.

9. Physical and Chemical Properties

Appearance: Black to dark grey solid, lump form. **Odor:** Odorless **Odor Threshold:** Not applicable **pH:** Not applicable (insoluble solid, pH-dependent in suspensions) **Melting Point/Freezing Point:** 535 °C (decomposes, loses O_2) **Initial Boiling Point and Boiling Range:** Decomposes before boiling **Flash Point:** Not applicable (inorganic solid) **Evaporation Rate:** Not applicable (inorganic solid) **Flammability (Solid, Gas):** Non-flammable **Upper/Lower Flammability or Explosive Limits:** Not applicable **Vapor Pressure:** Not applicable (inorganic solid) **Vapor Density:** Not applicable (inorganic solid) **Relative Density:** 5.026 g/cm³ (true density) **Bulk Density:** 2.0–2.6 g/cm³ **Solubility(ies):** Insoluble in water **Partition Coefficient n-octanol/water (log value):** Not applicable (inorganic solid) **Auto-Ignition Temperature:** Not applicable **Decomposition Temperature:** >535 °C (for pure MnO_2) **Viscosity:** Not applicable (solid) **Particle Size:** 10–80 mm (lump) **Moisture:** ≤2% **Crystal Phase:** Natural Pyrolusite (β-MnO_2)

10. Stability and Reactivity

Reactivity: Strong oxidant. Reacts violently with combustible and reducing materials, generating fire and explosion hazards. Reacts with aluminum powder. Inert to most acids except when heated.

Chemical Stability: Stable under normal conditions. The β-MnO_2 phase (pyrolusite) is the most stable form among MnO_2 polymorphs and maintains its structure up to 500 °C until oxygen loss begins.

Possibility of Hazardous Reactions: Violent reactions with combustible and reducing materials. Reacts with hydrochloric acid to form corrosive chlorine gas. Heating or rubbing with organic materials can cause fire hazard. Thermal decomposition can lead to release of irritating gases and vapors.

Conditions to Avoid: High temperatures (above 500 °C), contact with incompatible materials, dust generation.

Incompatible Materials: Strong acids (especially hydrochloric acid), strong bases, reducing agents, combustible materials, organic materials, aluminum powder.

Hazardous Decomposition Products: Oxygen (upon heating above 500 °C), manganese oxides, irritating gases and vapors.

11. Toxicological Information

Information on Toxicological Effects: Exposure to manganese dioxide can lead to various toxicological effects, primarily through inhalation and ingestion. Chronic exposure, especially by inhalation, can affect the central nervous system.

Acute Toxicity: Harmful if swallowed (Category 4). Harmful if inhaled (Category 4).

Skin Corrosion/Irritation: Contact can irritate the skin. May cause mild mechanical irritation.

Serious Eye Damage/Irritation: Contact can irritate the eyes. May cause mild mechanical irritation.

Respiratory or Skin Sensitization: Inhaling manganese can irritate the nose, throat, and lungs, causing respiratory effects such as increased incidence of cough, bronchitis, and pneumonia. Not classified as a skin sensitizer.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: ACGIH: A4 - Not classifiable as a human carcinogen.

Reproductive Toxicity: Evidence in laboratory mammals indicates that exposure to high levels of manganese may adversely affect sperm quality and produce decreased testicular function.

STOT-Single Exposure: May cause respiratory irritation.

STOT-Repeated Exposure: Chronic (long-term) exposure to high levels of manganese by inhalation in humans may result in central nervous system (CNS) effects, including changes in speech, balance, mood, personality, tremor, gait abnormalities, and headaches (Manganism).

Aspiration Hazard: No data available.

12. Ecological Information

Ecotoxicity: Low toxicity to aquatic organisms (fish, daphnia, algae). However, excessive Mn concentrations can cause notable damage to ecosystems and toxic effects on living beings.

Persistence and Degradability: Insoluble in water. Persistence is unlikely for the inorganic compound. The methods for determining the biological degradability are not applicable to inorganic substances.

Bioaccumulative Potential: No bioaccumulation potential is expected for this inorganic substance. No additional information available.

Mobility in Soil: Insoluble in water, therefore low mobility in soil is expected. No additional information available.

Other Adverse Effects: No known significant other adverse effects.

13. Disposal Considerations

Disposal Methods: Dispose of contents and container in accordance with local, regional, national, and international regulations. Solid MnO_2 is generally considered non-hazardous and can be disposed of according to institutional policies for non-

hazardous waste. Do not empty into drains. Sweep up spills and collect in suitable containers for disposal.

14. Transport Information

UN Number: UN1479 (Potentially, depending on specific form and concentration) **UN Proper Shipping Name:** Oxidizing solid, n.o.s., (Manganese dioxide) (Potentially) **Transport Hazard Class(es):** 5.1 (Oxidizer) (Potentially) **Packing Group:** III (Potentially) **Environmental Hazards:** Not classified as an environmental hazard for transport under normal conditions. **Special Precautions for User:** Always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

15. Regulatory Information

Safety, Health and Environmental Regulations Specific for the Product: Specific regulations vary by region and country. Users are advised to consult local, national, and international regulations applicable to the transport, storage, and use of manganese dioxide. Examples include OSHA (Occupational Safety and Health Administration) regulations in the US, GHS (Globally Harmonized System of Classification and Labelling of Chemicals) standards, and various environmental protection agency guidelines.

16. Other Information

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Disclaimer: The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.