TECHNICAL DATASHEET (TDS)

Product Name: MnO2 Nanoparticles for Next-Generation Supercapacitors
Company: BTLnewmaterial
Website: manganesesupply.com
Email: lixifirm@outlook.com
Phone/WhatsApp: +86 18273793022
Address: Room 706, No. 154, Wuyi East Road, Niezhou Residential Committee, Caizichi Sub-district Office, Leiyang City, Hengyang City, Hunan Province, China

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1. Product Description

MnO_2 Nanoparticles for Next-Generation Supercapacitors are high-purity, nano-scale manganese dioxide materials specifically engineered for advanced electrochemical energy storage applications. This product features controlled particle size, a high specific surface area, and stable electrochemical performance, making it an ideal candidate for electrode fabrication in high-performance supercapacitor systems.

2. Technical Specifications

Parameter	Typical Range
MnO_2 Purity	≥ 99.0%
Crystal Form	Amorphous / γ-MnO_2 (customizable)
Average Particle Size	20–80 nm
Specific Surface Area (BET)	120–220 m^2/g
Tap Density	0.4–0.8 g/cm^3
Moisture Content	≤ 0.5%
pH (5% slurry)	5.5–7.5
Appearance	Black/Dark Brown Fine Powder
Electrical Conductivity	Optimized for electrode use

3. Key Features

- **Nano-scale Morphology:** Enhances ion diffusion pathways and charge storage efficiency.
- **High Surface Area:** Supports increased specific capacitance and enables rapid charge–discharge behavior.
- **Controlled Particle Size:** Ensures consistent electrode coating and simplifies processing.
- **High Purity:** Low impurity levels improve cycle stability and minimize internal resistance.
- **Compatibility:** Excellent compatibility with carbon-based conductive additives and various polymer binders.
- **Structural Stability:** Maintains integrity under high-rate and repeated cycling conditions.

4. Applications

- **Supercapacitor Electrodes:** Primary material for high power density electrode fabrication.
- **Hybrid Storage Systems:** Integration with lithium-ion or sodium-ion battery technologies.
- **Flexible Electronics:** Suitable for thin-film supercapacitors in wearable and portable devices.
- **Energy Buffering:** Used in renewable energy systems and regenerative braking components.

5. Packaging & Supply

- **Standard Packaging:** 1 kg aluminum foil bags; 5 kg and 10 kg fiber drums.
- **Bulk Supply:** Available for pilot-scale and mass production requirements.
- **Shipping:** Export-ready packaging compliant with international transport standards.
- **Customization:** Particle size, crystal structure, and surface characteristics can be adjusted upon request.
