

Material Product Data Sheet

Lanthanum Strontium Manganite (LSM) Powder

Thermal Spray Powder Products: Metco™ 6800, Metco 6801

1 Introduction

Lanthanum Strontium Manganite (LSM) is widely used for YsZ electrolyte-based Solid Oxide Fuel cells. It is the cathode material of choice and is also used as an evaporation barrier on chromite-based interconnects to avoid cathode poisoning. What makes this material particularly interesting is that its coefficient of thermal expansion is similar to that of doped zirconia and its good electrochemical performance above 800 °C (1475 °F).

Oerlikon Metco's LSM materials are synthesized in-house by solid state reaction from high-purity raw materials to produce a slightly A-site deficient, single-phase Perovskite structure (ABO₃), thus improving ionic mobility through the crystalline structure. Chemical compositions for Oerlikon Metco fuel cell materials are expressed in mol%.

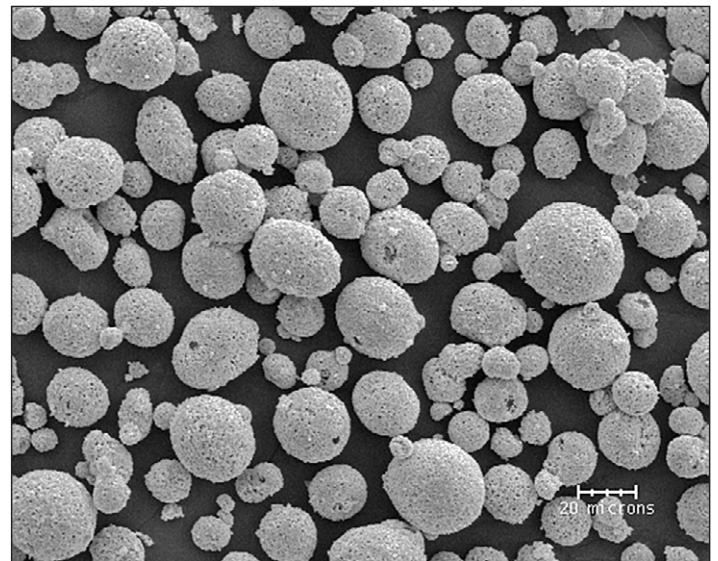
Metco LSM products are agglomerated and sintered materials sized for thermal spray application.

1.1 Typical Uses and Applications

- Protective coating to limit the effects of chromia evaporation from metallic SOFC interconnects
- Catalysts and sensors

Quick Facts

| | |
|-------------------|---|
| Classification | Ceramic, SOFC |
| Chemical formula | (La _{0.8} Sr _{0.2}) _{0.98} MnO ₃ |
| Crystal structure | Single-phase Perovskite |
| Manufacture | Agglomerated and sintered |
| Purpose | Protective coating |
| Morphology | Spheroidal |
| Apparent density | 2.0 ± 0.5 g/cm ³ |
| Process | Atmospheric Plasma Spray |



2 Material Information

2.1 Chemical Composition

| Product | Stoichiometry | Crystal Structure | % Purity |
|------------|-----------------------------------|-------------------------|----------|
| Metco 6800 | (La + Sr) / Mn = 0.98 ± 0.02 mol% | Single-phase Perovskite | > 99.9 |
| Metco 6801 | (La + Sr) / Mn = 0.98 ± 0.02 mol% | Single-phase Perovskite | > 99.9 |

Note: Other stoichiometries are available upon request.

2.2 Particle Size Distribution

| Product | Apparent Density g/cm ³ | Nominal Size Range μm | D90 μm | D50 μm | D10 μm |
|------------|------------------------------------|-----------------------|--------|--------|--------|
| Metco 6800 | 2.0 ± 0.5 | -45 +15 | 40 ± 5 | 35 ± 5 | 20 ± 5 |
| Metco 6801 | 2.0 ± 0.5 | -53 +22 | 50 ± 5 | 35 ± 5 | 22 ± 5 |

Note: Particle size analysis by laser diffraction (Microtrac). Other size distributions are available upon request.

2.3 Key Selection Criteria

- Use material best suited for the specific plasma gun to be used.
- Choose material according OEM specification, if applicable.
- Differences in particle size distribution may heavily influence achievable deposition efficiency, coating density and roughness.

2.4 Related Products

- Metco 6613 is an 8 mol.% YsZ material designed for SOFC applications.
- Metco 683X series products are LSCF type materials for SOFC applications (see Materials Data Sheet DSMTS-0118).
- Metco 6820 is a MCO type material that can be used as an alternative material to LSM. (see Materials Datasheet DSMTS-0120).
- Other compositions such as LSCC, CGO can be offered as test powders.

3 Coating Information

3.1 Coating Parameters:

Please contact your Oerlikon Metco Account Representative for parameter availability. For specific coating application requirements, the services of Oerlikon Metco's Coating Solution Centers are available.

Recommended Atmospheric Plasma Spray Guns

TriplexPro™ series

4 Commercial Information

4.1 Ordering Information and Availability

| | Order No. | Package Size | Availability | Distribution |
|------------|------------------|----------------------|---------------------|---------------------|
| Metco 6800 | 1069115 | 5 kg (approx. 11 lb) | Stock | Global |
| Metco 6801 | 1070552 | 5 kg (approx. 11 lb) | Stock | Global |

4.2 Handling Recommendations

- Store in the original container in a dry location
- Tumble contents prior to use
- Opened containers should be stored in a drying oven to prevent moisture pickup

4.3 Safety Recommendations

See SDS 50-1238 (Safety Data Sheet) in the localized version applicable for the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).