

Low-energy densification of LaMnO₃ ceramics via spark plasma sintering

Tuesday, 1 September 2026 18:00 (20 minutes)

LaMnO₃ ceramics (LMO) are well known for many electronic applications. In this report, LMO was synthesized using solid-state reaction process. The precursors oxides were weighed in stoichiometric proportions and mechanically mixed in a planetary ball mill. Calcination was carried out at 1000 °C for 3 h. The calcined powder was loaded into graphite dies lined with graphite foils and subsequently densified by spark plasma sintering (SPS) equipment. The sintering conditions were a pressure of 80 MPa, a temperature range from 1000 °C to 1200 °C, 100 °C/min and dwell times of 5, 10 and 15 min. Phase analysis was realized by X-ray diffractometry (XRD). Using focused ion beam scanning electron microscopy (FIBSEM), micrographs of the sintered ceramics were obtained. The densities of the samples ranged from 80 % of the theoretical density to 96 % (1200 °C, 10 min). Density decreased with a longer dwell time (>10 min) at 1200 °C. Activation energy for sintering was calculated as 44 kJ/mol. With grain size values, grain growth kinetics were determined. Grain growth exponent was 2.4, indicating diffusion on single-phase material combined with coalescence of second phase. Activation energy for grain growth was 262 kJ/mol.

Acknowledgments: Grants CIAICO/2023/264(Generalitat Valenciana), PID2023-147490OB-I00, CNS2023-144190(MICIU/AEI/10.13039/501100011033, “ERDF/EU” and the “European Union Next Generation EU/PRTR” , 316730/2023-8(CNPq), APQ-01856-22(FAPEMIG), 23038.003930/2024-79(CAPES).

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

Authors: MARTINS MANSANO ROSA, João Paulo (Universitat Politècnica de València and Universidade Federal de Itajubá); Dr SUÁREZ, Marta (Centro de Investigación en Nanomateriales y Nanotecnología (CINN-CSIC), Universidad de Oviedo); Prof. THOMAZINI, Daniel (Universidade Federal de Itajubá); Prof. GELFUSO, Maria Virginia (Universidade Federal de Itajubá); Prof. BORRELL, Amparo (Universitat Politècnica de València)

Presenter: Prof. BORRELL, Amparo (Universitat Politècnica de València)

Session Classification: Poster Session

Track Classification: Group 3: Field assisted sintering technology/Spark Plasma Sintering FAST/SPS