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Rheological Study of Doped Lanthanum Chromite Aqueous Suspension

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Lanthanum chromite (LaCrO_3) is the most studied material for SOFC's interconnectors' production. The complexity of microstructures and geometries of SOFC devices often requires the use of colloidal processing techniques, which have received increased attention in the last years for obtaining complex parts with controlled microstructure and high reliability. Much effort has been devoted to the processing of electrodes and electrolytes but the other layers, such as that of interconnecting material, have received scarce attention. This paper deals with the rheology and casting behaviour of lanthanum chromite based materials to produce interconnectors for SOFCs. A powder with the composition $\text{La}_{0.80}\text{Sr}_{0.20}\text{Cr}_{0.92}\text{Co}_{0.08}\text{O}_3$ was obtained by combustion synthesis. Aqueous suspensions were prepared to solids loading ranging from 8 to 17.5 vol.%, using ammonium polyacrylate (PAA) as polyelectrolyte/dispersant and tetramethylammonium hydroxide (TMAH) to assure basic pH. The influence of the additives concentrations and suspension ball milling time were studied. Suspensions prepared with 24 hours ball milling, with 3 wt.% and 1 wt.%, of PAA and TMAH respectively, yielded the best conditions for successful slip casting, leading to relatively dense materials, sintered at 1600°C for 4 h in air.