

Sintering under AC electric field of samarium doped ceria

shirley Leite dos Reis¹, Sabrina Gonçalves de Macedo Carvalho¹, Eliana Navarro dos Santos Muccillo¹, Reginaldo Muccillo¹

¹Instituto de Pesquisas Energéticas e Nucleares

e-mail: shirley.reis@usp.br

Samarium doped ceria (SDC) is a high oxygen-ion conductor compound with application in solid oxide fuel cells operating at intermediate temperatures (500-700°C). Polycrystalline SDC exhibits low sinterability, requiring high temperatures to achieve full densification under conventional sintering. Flash sintering is a recently developed method in which ceramic compacts may be sintered at lower temperatures and shorter times than those under conventional sintering. It consists in applying an electric field to a green compact, either during heating or at a fixed temperature up to the occurrence of an electric current pulse. In this study, samarium doped ceria ($\text{Ce}_{0.8}\text{Sm}_{0.2}\text{O}_{1.9}$) was sintered by applying AC electric field at a fixed frequency of 1.0 kHz to the specimen during heating (dynamic sintering) or during a fixed temperature (isothermal). The influence of sintering on densification, microstructure and ionic conductivity was investigated. Similar density values were obtained for specimens sintered at 800°C (dynamic) and 1100°C (isothermal).