

Thermo-mechanical properties of SOFC components investigated by a combined method

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Co-firing process of different ceramic materials can lead to significant stress and deformation at the multilayer. This is the net effect of a complex set of phenomena such as the removal of organic additives from the green tapes (de-binding), solid state diffusive phenomena during the sintering, and differential thermo-mechanical behavior at each layer. The combination of such factors can have a critical effect on the final shape and microstructure, and on the mechanical integrity. Thermo-mechanical properties and sintering mechanisms of important SOFC materials (CGO, YSZ, ScYSZ) were systematically characterized by mean of the combined use of optical dilatometry, cyclic loading thermo-mechanical analysis and scanning electron microscopy. The results from the different techniques were found complementary and the thorough understanding of viscoelastic properties of individual layers led to optimization of firing strategy and SOFC design, fundamental to avoid shape instability. *Work sponsored by EUDP (Danish energy agency) project 64012-0225 "SOFC accelerated".*