Enhancing the long-term stability of Ag based seals for solid oxide fuel/electrolysis applications by simple interconnect aluminization

Ag-(0.8 mol%) CuO is used to successfully join aluminized ferritic stainless steel interconnect to the ceria-gadolinia (CGO) barrier layer of a solid oxide fuel/electrolysis cell by reactive air brazing at 1000 °C in air. The wetting of AgCuO on CGO is tailored by varying the CuO content. The effects of the CuO content on the joint microstructure are discussed. The long-term stability of brazed joints is evaluated by aging in oxidizing (air) and reducing (4% H2:50% H2O:N2) atmospheres at 800 °C for 250 h. An Ag-2mol% CuO braze results in the best joint stability during aging. Aluminization of the steel to create an alumina surface layer provides excellent protection of the steel both during the joining process and aging in the 2 atm. No degradation related to steel corrosion and outward diffusion of elements from the steel can be observed.

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