

Study of possibility of silver-glass composite as sealant and interconnect for honeycomb solid oxide fuel cell

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Composites of silver and glass may provide a solution for sealants and interconnect under the conditions prevailing in the honeycomb sofc. Of the metals, silver is an excellent candidate because of its high stability against oxidation at high temperatures, good compliance, high tolerance for thermal cycling and reasonable cost. Pyrex glass possesses self-healing and gap filling capability till 900oC. Silver-glass pastes were made by mixing the silver oxide-glass powder and binder. The paste was applied between two alumina tubes, which were forced together by metal springs. Pure hydrogen was supplied inside the sealed tubes and nitrogen was supplied outside. The system was heated to 800C and then cycled between room temperature and 800C at a rate of 300C/h. The leak rate of the seal was calculated from the leak rate of hydrogen into the nitrogen flux over time. The sealant showed low impermeable rates of hydrogen gas, high resistance to thermal shock, and chemical stability under both reducing and oxidizing atmospheres; as well as highly electronic conduction at room temperature.