Characterization of glasses for SOFC sealing applications
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Objective: To characterize the microstructure and chemistry changes in candidate glasses for SOFC sealing applications and develop models to predict its evolution as a function of service time and environment.

Requirements for SOFC glass seals
• Simultaneous fulfillment of thermal, physical, chemical, mechanical and electrical property requirements.
• Phase stability and chemical compatibility without substantial property degradation for 40,000 hours in oxidizing and wet reducing environments.

Evolution of Porosity with Time of Exposure

G6 and SCN
Commercially available Alkali Barium Silicate glasses
• Powders are cold pressed into pellets followed by sintering at 850°C for 2 hours. Specimens exposed at 800°C for 10,000 hours on 8YSZ and Alumina substrates (longer term exposures in progress)
• Exposure in air and steam+H₂+N₂

Summary
• The effect of time of exposure in air and steam+H₂+N₂ at 800°C on the microstructural, chemical and dimensional stability of two commercially available alkali barium silicate glasses is being investigated
• The kinetics of devitrification, porosity and pore size distribution were characterized. Models are being developed to predict microstructural changes for long periods of service time.
• Long-term exposure of SCN and G6 glasses (20,000 hours+) is in progress.

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