**High-Temperature Viscous Sealing Glasses for Solid Oxide Fuel Cells**

**MO-SCI Corporation**

Rob Baird1,Richard K. Brow2, Ray Crouch1, Jen Hsien Hsu2, Cheol-Woon Kim1,

Raphael Reis2, and Joe Szabo1, Casey Townsend2

1MO-SCI Corporation 2Missouri University of Science and Technology2

e-mail: ckim@mo-sci.com Phone: (573) 364-2338

Glass compositions have been formulated and tested for use as viscous seals for solid oxide fuel cells (SOFCs). These alkali-free borosilicate glasses possess desirable thermo-mechanical properties and thermo-chemical characteristics, and exhibit promising hermetic sealing and healing behavior under SOFC operational conditions. The dilatometric softening points (Ts) and the glass transition temperatures (Tg) of the glasses are generally under 650°C, the lower bound of the SOFC operating temperature. To date, glass seals between a NiO/YSZ bilayer and aluminized 441 stainless steel have survived 103 thermal cycles (room temperature to 750°C) under wet forming gas at a differential pressure of 0.5 psi (26 torr) over the course of > 3,500 hours without failure, and 100 thermal cycles in dry air. Seals intentionally cracked upon quenching from 750°C to room temperature at > 25°C/s become hermetic upon reheating to 725°C and higher.