Hybridization of Freeze Casting with Additive Manufacturing for Simplified Production of High Performance SOFCs - DOE Phase I STTR

Dr. David Driscoll, Glacigen Materials Inc. – ddriscoll@glacigen.com Prof. Stephen Sofie, Montana State University

Project Objectives

- Demonstrate hybridization of freeze tape casting with additive manufacturing.
- Print SOFC electrodes with high-performance FTC structure.
- Co-sinter entire SOFC in single, lowtemperature step.

Approach

Green Tape

Casting Bed

What Glacigen Does:









Templated (printed) Nucleation Sites Mylar Film Metallic Freeze Bed (\approx -40°C





11111

Key Results





Glacigen Applied to SOFCs:





lignment when looking down nto electrode. This cell was constructed with electrodes in a "cross-flow" rrangement





Going Forward

- Print entire cell in single step!
- Advance FTC-AM apparatus.

Acknowledgement

Glacigen gratefully acknowledges the support of the US Department of Energy under Award No. DE-SC00017821.

Beyond doping of YSZ to enable low temperature sintering without chemical interaction, match doping schemes in active anode & cathode materials to tailor shrinkage of entire cell

