Progress in Metal-Supported Solid Oxide Fuel Cells

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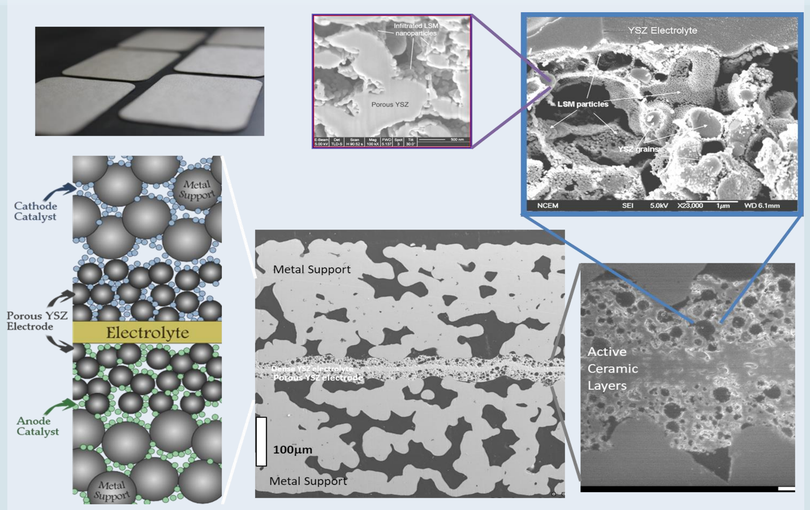
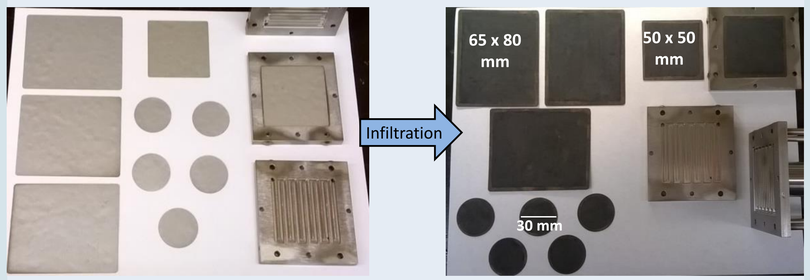
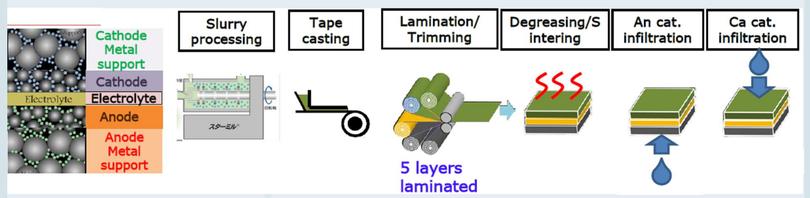
Symmetric-Architecture at LBNL



MS-SOFC Scalability

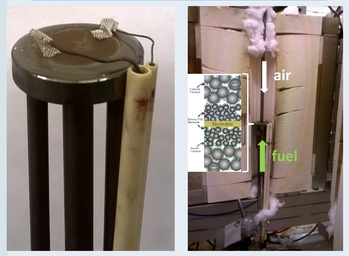


Fabrication



1. Tape casting and lamination of all cell layers in a single step
2. Co-sintered ceramic and stainless steel layers in reducing atmosphere (catalyst absent)
3. Catalyst introduced by infiltration (flexible catalyst compositions)

Current Collectors Welded on Cell



Advantages of symmetric-architecture MS-SOFCs

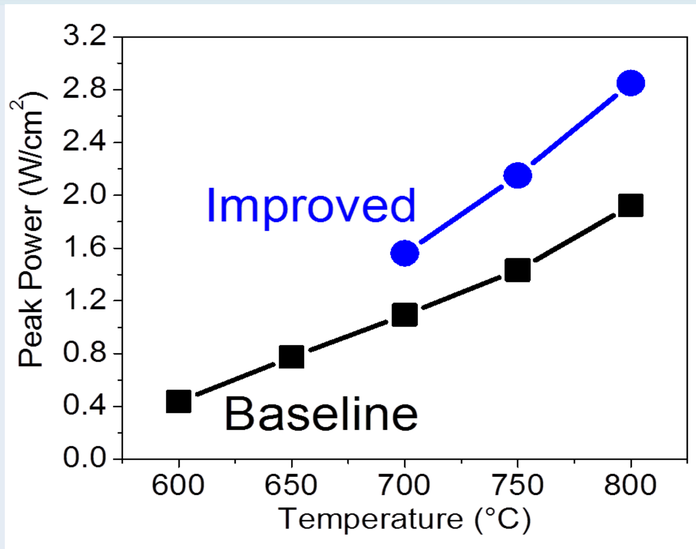
1. Extreme thermal cycling
2. Redox stable
3. Mechanically robust
4. Cells do not warp
5. Flexible infiltration process:

- allows for variety of catalyst compositions based on fuel composition

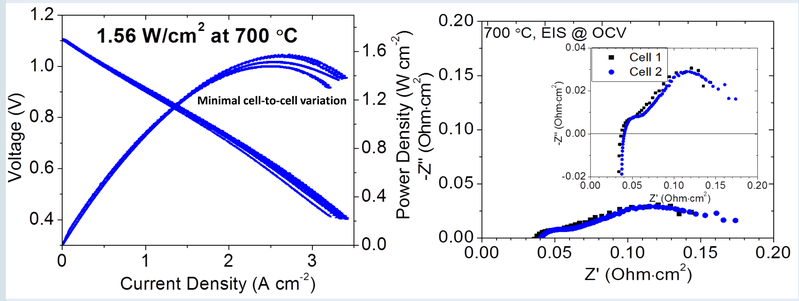
-multi-layer catalysts allow for targeted applications

6. Excellent current collection (weld on both sides)

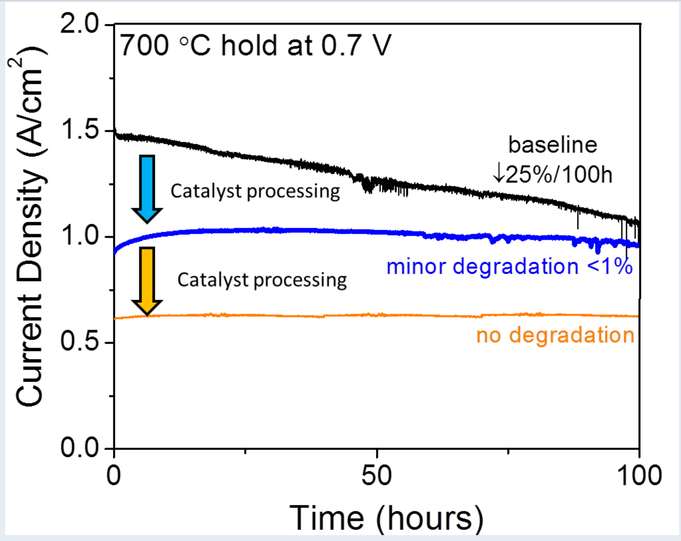
Power Density Progress at LBNL



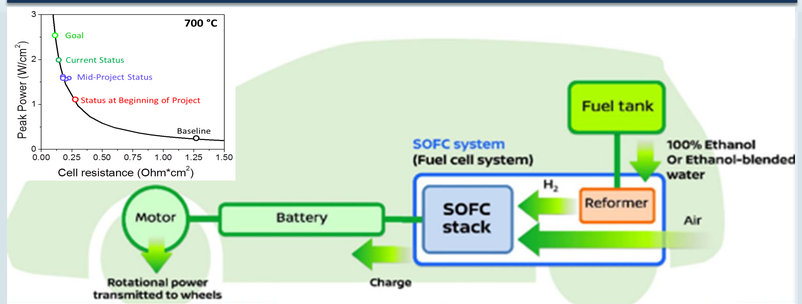
High Performance

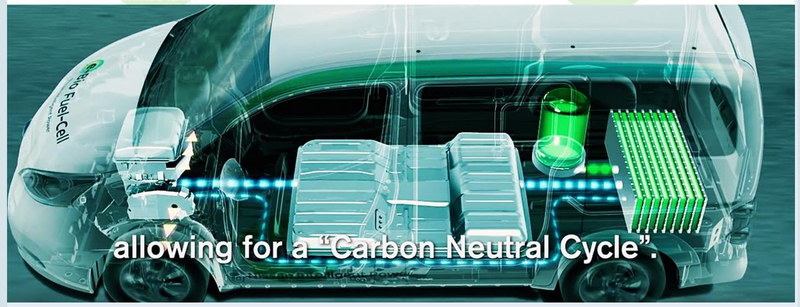


Durability

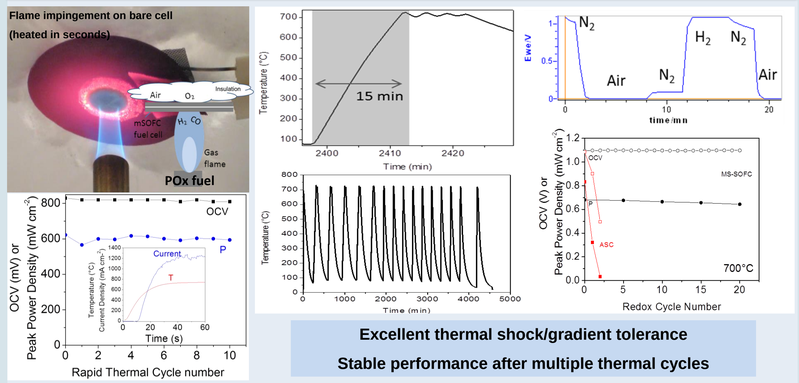


Nissan's SOFC-powered Vehicle





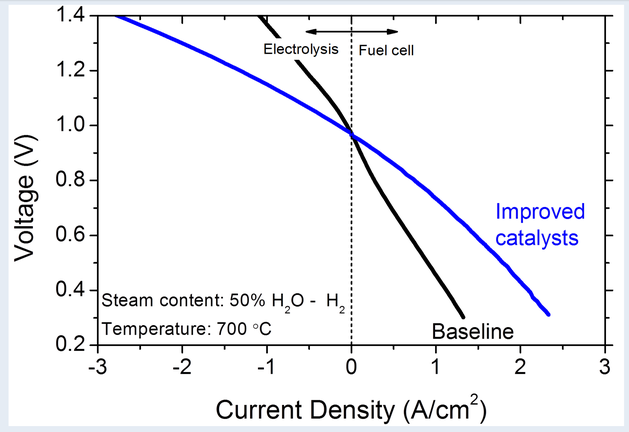
Thermal and Redox Cycling



Excellent thermal shock/gradient tolerance

Stable performance after multiple thermal cycles

Electrolysis



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