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Available Technologies

# Glass Fiber Mesh Method of Joining

## SUMMARY

Among the critical issues in designing and fabricating a solid oxide fuel cell (SOFC) stack are the materials and techniques for hermetically sealing the metal and/or ceramic components. Researchers at PNNL have developed a high-strength seal incorporating metal mesh and glass fibers. The unique method results in a durable, insulating seal that resists the damages commonly brought on by thermal cycling.

The seal uses microscopic metal screening spot welded to the metal surface that serves as an anchor for the heated glass. Ceramic fibers are applied between the two surfaces being joined during thermal cycling providing additional strength in the seal. The heated glass bonds to the anchors and the fibers hermetically forcing the energy to pass through the ceramic layer of the stack; this maximizes the energy efficiency of the cell. The insulating feature also allows the stack to withstand heating variations (stacks typically do not heat uniformly) that commonly create seal failures in fuel cells.

The Glass Fiber Mesh Seal method is ideal for applications needing quick thermal cycling (responsiveness) such as transportation or stationary applications such as high-use distributed energy sources.

## ADVANTAGES

- \* Stronger than typical glass seals
- \* Insulating features provide for better energy efficiency
- \* Quick thermal cycling allows power to be delivered more quickly.



### Technology Portfolio(s)

- » SOFC

### Potential Industry Applications

- » Aerospace & Defense
- » Agriculture & Mining
- » Automotive & Transportation
- » Computers & Electronics
- » Consumer Products
- » Energy & Utilities
- » Manufacturing & Warehousing

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