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Battelle Number(s):

12128-E

Patent(s) Issued

Available for licensing in some
fields

Available Technologies

Glass-Ceramic Seal for Solid Oxide Fuel Cells

SUMMARY

One of the critical issues in designing and fabricating a solid oxide fuel cell (SOFC) stack is the development of appropriate materials and techniques for hermetically sealing the metal and/or ceramic components. Researchers at PNNL have developed a unique method that results in a stronger, more robust seal that can stand the tests of time.

The patented glass-ceramic compositions possess high resistivity and holds up well in both reducing and oxidizing environments. Additionally, the glass-ceramic composition can be tailored to yield a wide range of thermal expansions. Sealing temperature may also be adjusted over a range of 750-950° C. The glass-ceramic seal material has exhibited very strong bonding to both zirconia and ceria-based ceramics with little or no interaction after thousands of hours of operation at elevated temperature. Due to the high amount of crystalline material in the seal, it is resistant to creep, which is necessary for long-term operation at temperature. One composition has operated in an SOFC stack in excess of 4,000 hours.

ADVANTAGES

- * Thermal expansion and sealing temperature can be tailored to specific need
- * Better structural properties (creates a rigid material without viscous flow)
- * Resulting material is more robust, providing for a stronger seal
- * In manufacture, the method does not require a high compressive load to form a strong seal. This removes load considerations for other components, which must be able to stand up to the load in a load-bearing sealing process.

STATE OF DEVELOPMENT & AVAILABILITY

Technology is licensed in limited fields of use. Please check with the commercialization manager regarding specific applications.



Patents & Intellectual Property

- » Patent #: 6,430,966
- » Patent #: 6,532,769

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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