

**Battelle Number(s):**

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Patent(s) Issued

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# Reactive Air Brazing: Method of Joining Ceramic and Metal Parts

## SUMMARY

Researchers at PNNL have developed a new, low-cost method for hermetically sealing ceramic and metallic components used in high-temperature electrochemical devices. The technique, referred to as reactive air brazing (RAB), utilizes a novel copper oxide-silver single phase liquid as the basis for joining electrochemically active ceramics such as yttria stabilized zirconia and lanthanum strontium cobalt ferrite to oxidation resistant materials such as FeCrAlY. Materials of this type are commonly employed in the oxygen generators used in syngas production, solid oxide fuel cells and solid-state sensors.

Unlike the previous sealing techniques, based primarily on high-temperature glasses, the RAB joints exhibit excellent thermal cycling performance and long-term stability in both high-temperature oxidizing and reducing atmospheres. An additional advantage of the RAB technique is that the sealing process is conducted in-air, which minimizes the capital expenses and operating costs associated with the joining operation.

This innovative method enables cost-reduction and performance in wide-array of potential applications.

## ADVANTAGES

- \* Useful for ceramic-metal and ceramic-ceramic joining
- \* Joining is completed directly “in air”
- \* Results in high-strength, ductile joint.

## RELATED LINKS

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<http://energymaterials.pnnl.gov/>

### Patents & Intellectual Property

» Patent #: 7,055,733

### Technology Portfolio(s)

» SOFC

### Potential Industry Applications

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