

ORNL is developing low-cost, slurry-based ceramic corrosion resistant coatings to protect silicon based materials, such as silicon carbide, from corrosion and chemical attack at high temperatures due to fossil environments.

Slurry-based coatings are needed for complex-shaped components such as heat exchangers, shrouds, and gas filters because line-of-sight processes like plasma spraying and electron beam physical vapor deposition are unable to completely and/or inexpensively coat complex shapes. Slurry-based mullite and zircon coatings were recently deposited onto Hexaloy silicon carbide (SASiC) substrates and sintered to full density using either traditional sintering methods or the high density infrared sintering process (HDI). Both coating compositions demonstrated little microstructural change during initial evaluation and testing and exhibited no interaction with the substrate.

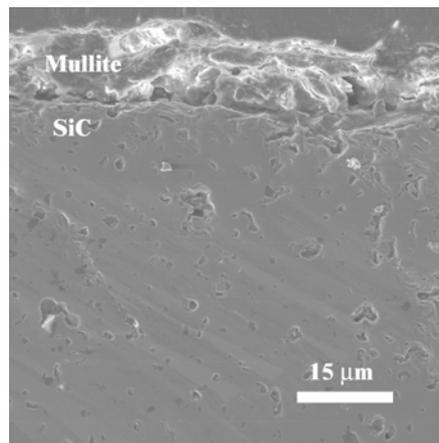


Figure 1. Dip coated mullite on SASiC substrate. Densified at 1600°C for 2 hours.

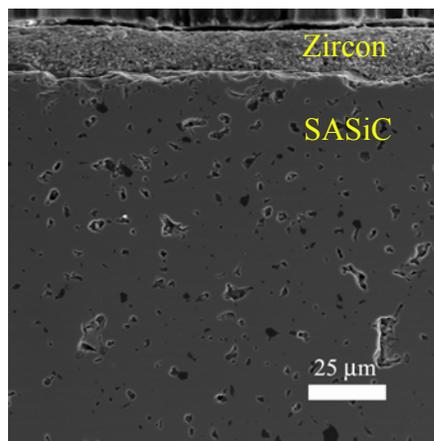


Figure 2. Screen printed zircon on SASiC substrate. Densified with High Density Infrared Sintering Process (HDI).

[Read more about this work.](#)