

## Award Winning Technology

**FLC**<sup>TM</sup>  
FEDERAL LABORATORY CONSORTIUM  
FOR TECHNOLOGY TRANSFER



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Scale, inches

## Cerium Oxide Coating for Oxidation Reduction

In order to produce power more efficiently and cleanly, the next generation of power plant boilers, turbines, solid oxide fuel cells (SOFCs) and other essential equipment need to be operated at extreme pressures and temperatures known as the “ultrasupercritical” range. Even nickel-based superalloys and stainless steels suffer from excessive oxidation at these conditions, leading to the premature failure of components. To avoid equipment failure with such extreme conditions, NETL developed a cerium oxide-based coating that can be applied as a slurry to a metal part by brushing, spraying, or dipping. The coating helps to increase the oxidation resistance of nickel-based superalloys, as well as ferritic and austenitic stainless steels, by diffusing into the metal. In most cases, this coating improved metal oxidation resistance by a factor of 2 to 3.

This technology provides an easy, inexpensive method to apply a protective coating to complex metal parts of all shapes and sizes. The coating has applications in markets such as advanced, next-generation power plant components; solid oxide fuel cells; heaters and heat exchangers; or any other application where oxidation-resistant metals are needed.

In 2010, the Cerium Oxide Coating was the recipient of an R&D 100 Award, given by *R&D Magazine* to recognize the 100 most technologically significant products entering the marketplace each year. This coating technology was also awarded the 2010 “Outstanding Technology Development” award from the Federal Laboratory Consortium.

This technology is currently available for licensing and/or further research and development.

### Contact

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