

## High Temperature Oxidation Behavior of Spark Plasma Sintered Cr<sub>3</sub>C<sub>2</sub>@SiC-NFA Composites in Water Vapor Environment

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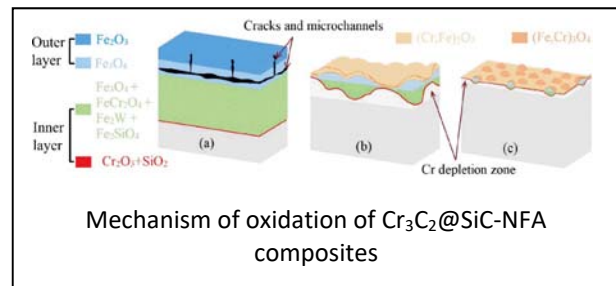
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### Abstract

This work focuses on the oxidation resistance of a new class of composites, chromium carbide coated silicon carbide-nanostructured ferritic alloy (Cr<sub>3</sub>C<sub>2</sub>@SiC-NFA) composite, in a water vapor containing atmosphere at 500-1000°C<sup>1</sup>. Oxidation temperature effects on surface morphologies, scale characteristics and cross-sectional microstructures are investigated and analyzed. The Cr<sub>3</sub>C<sub>2</sub>@SiC

content in the composites is strongly associated with the oxidation resistance by forming a dense Cr- and Si-rich inner-layer, which can be explained based on the Thermo-Calc simulation. The fundamental understandings offer important guidance for the applications of this class of composites in nuclear reactors and high temperature moist environments.



[1] Kaustubh Bawane, Kaijie Ning, Kathy Lu, 'High temperature treatment of Cr<sub>3</sub>C<sub>2</sub>@SiC-NFA composites in water vapor environment', Corrosion Science, 131 (2018) 365-375.

### Biography

*Kaustubh is third year PhD student in MSE department currently working with Prof. Kathy Lu. He works on the processing and characterization of silicon carbide and nanostructured ferritic alloy composites. He has published 4 journal papers related to his PhD research. He did his Masters of Engineering from Indian Institute of Science, Bangalore and Bachelors of Technology from College of Engineering, Pune in India before joining Virginia Tech for PhD in Fall 2016.*

