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Interfacial Coatings on Carbon Fibers

N. Baklanova

Institute of Solid State Chemistry & Mechanochemistry SB RAS

T. Zima

Institute of Solid State Chemistry & Mechanochemistry SB RAS

N. Morozova

Institute of Inorganic Chemistry SB RAS

I. Igumenov

Institute of Inorganic Chemistry SB RAS

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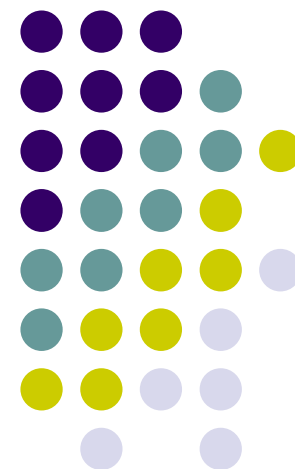
Interfacial Coatings on Carbon Fibers

¹⁾N. Baklanova, ¹⁾T. Zima, ²⁾N.Morozova, ²⁾I. Igumenov

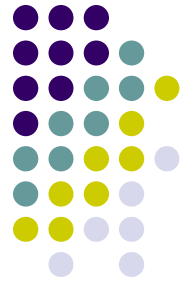
¹⁾Institute of Solid State Chemistry & Mechanochemistry SB RAS,
Novosibirsk, Russia,

²⁾Institute of Inorganic Chemistry SB RAS,
Novosibirsk, Russia

baklanova@solid.nsc.ru



Motivation

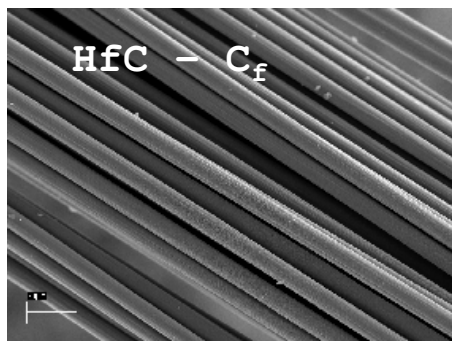
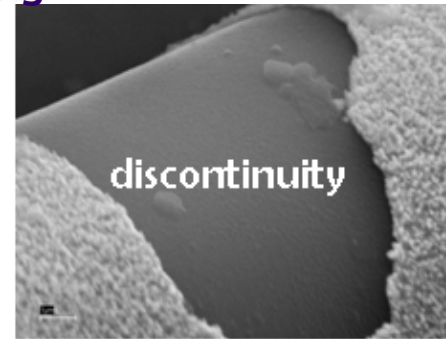
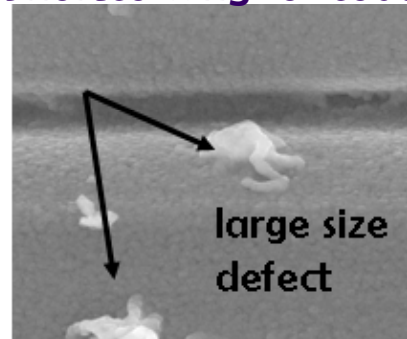
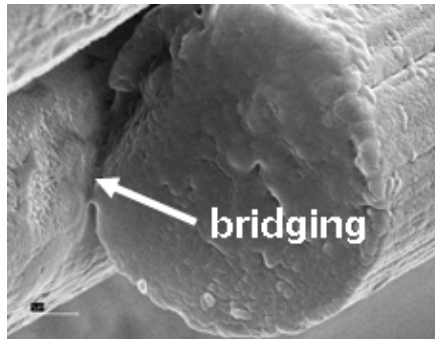


Interphase plays a key role of governing the properties of UHTC composites reinforced by fibers

Functions of interphase in UHTC composites:

- to improve low fracture toughness;
- to improve the ablation behavior of composite;
- to protect Cf from attacks by melted metals or other aggressive reactants during the matrix fabrication

Shortcomings of coatings



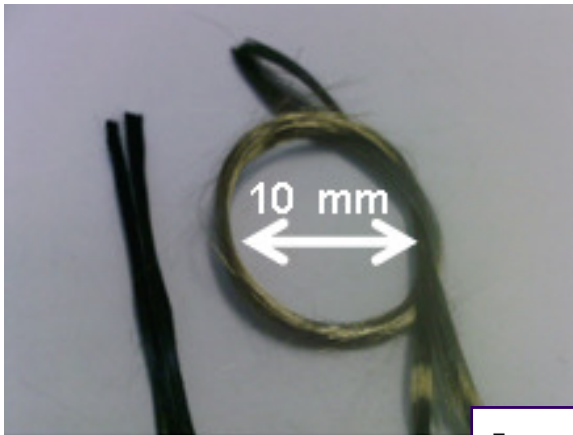
Purpose

The development of low-temperature processing methods for deposition of ultra high-melting compounds in form of nanoscale coatings on reinforcing fibers

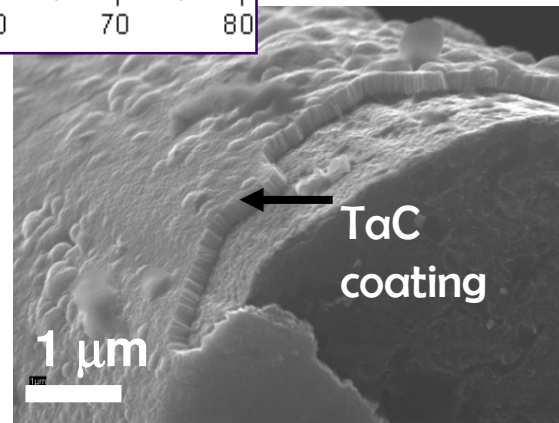
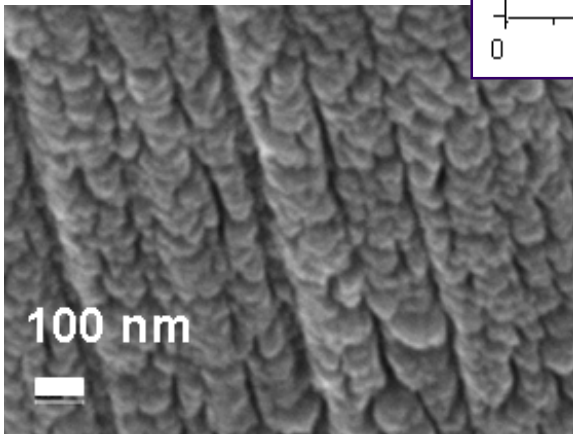
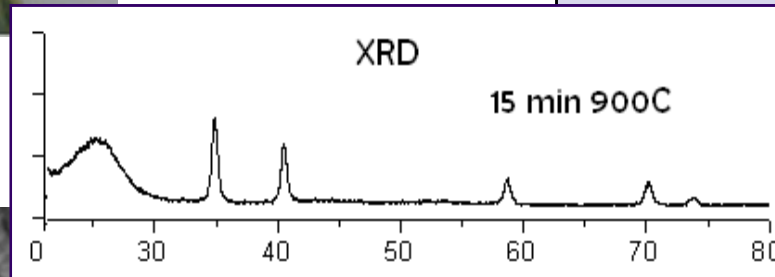
Results



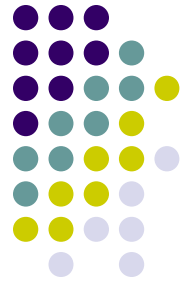
TaC coating on carbon fibers



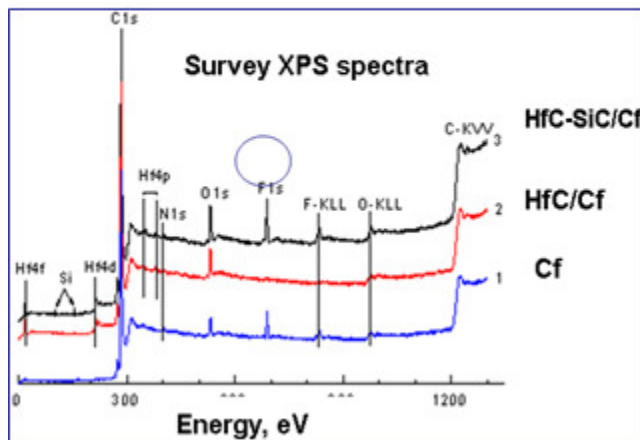
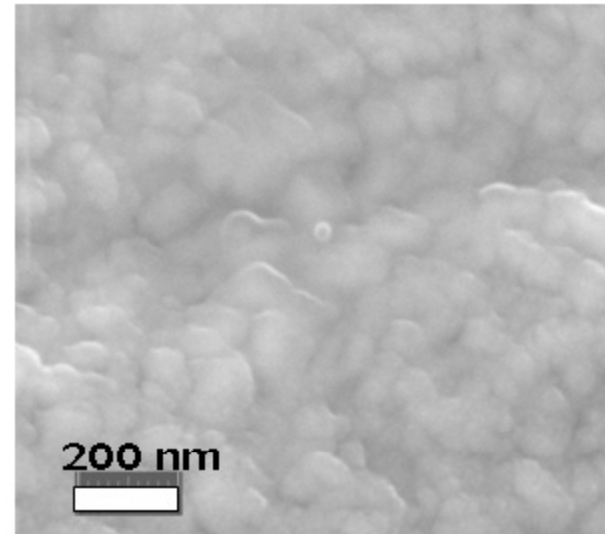
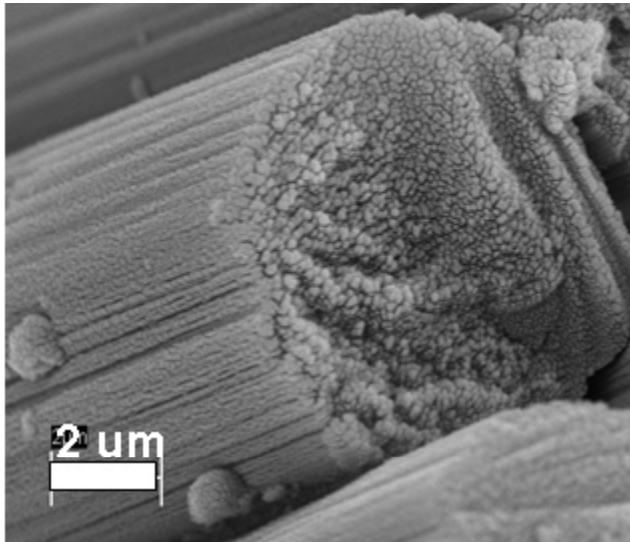
Me-C-F system
RCVD $T = 800-1000^{\circ}\text{C}$
 $\tau = 15-30$ minutes
Reduced pressure
Discrete and continuous
fibers



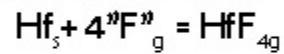
HfC coating on carbon fibers



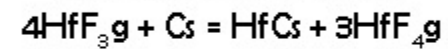
HfC-coated discrete Cf



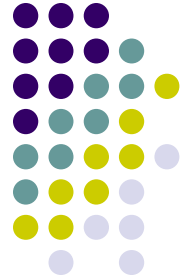
Hafnium zone:



Carbon fiber zone:



Hafnium fluoride, of low valency are available in the gas phase!



Thank you for attention!