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SiC fibers based on nanometallocarbosilanes

Dmitry Zhigalov

SSC RF GNIICHTEOS, Russia

Researches of GNIICHTEOS have developed and patented a highly efficient method for the preparation of pre-ceramic nanometallopolycarbosilanes containing nanoparticles of refractory metal (Zr, Hf and Ta) compounds. It is found that all synthesized nanometallocarbosilanes have fiber-forming properties. Polymer fibers were prepared from them, their curing (in an oxidizing atmosphere), and pyrolysis resulted in the formation of silicon carbide fibers modified by compounds of refractory metals (Zr, Hf, Ta). The morphology of the surface and elemental composition of samples of SiC fibers modified by Hf and Ta compounds was studied, and also, unmodified SiC fibers samples were analyzed for comparison using a scanning electron microscope Philips SEM505, equipped with a Sapphire Si(Li) SEM10 energy dispersive detector and a Micro Capture SEM3.0M image capture system. It is found that refractory metals absorb oxygen with the formation of inert products (HfO_2 , Ta_2O_5), which protect the surface of the SiC fibers, increasing its thermal stability.

Biography

Dmitry Zhigalov is a Researcher of the State Research Institute for Chemistry and Technology of Organoelement Compounds (GNIICHTEOS). His scientific interests cover synthesis, structure and reactivity of polycarbosilanes and nanometallopolycarbosilanes, as well as obtaining components of ceramic composite materials on their basis.

zhigalov@eos.su

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