Synthesis of ceramic-forming Nanohafniumtantalumcarbosilanes

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Abstract

The researchers of GNIIChTEOS have synthesized ceramic-forming nanohafniumtantalum carbosilanes (HfTaPCS) with a specified molar ratio of Ta:Hf metal atoms, which allow after the pyrolysis of HfTaPCS obtaining SiC ceramics modified with mixed refractory metal carbides with a maximum melting point. Nanohafniumtantalumcarbosilanes are obtained by reacting raw polycarbosilane (raw PCS) with alkylamide compounds of hafnium and tantalum of $Hf(NR_2)_4$ formula, where R–CH_3, C_2H_5 and of $Ta(NR^1{}_2)_{5-2z}(=NR^2)_z$ formula where R^1 – CH_3, C_2H_5, R^2 – t-C_4H_9, z = 0, 1. Physicochemical properties of the synthesized HfTaPCS and ceramics samples obtained as a result of pyrolysis of HfTaPCS at 1100°C in argon were studied by NMR, IR, TGA, X-ray phase analysis, SEM, elemental analysis. The obtained polymers can be used as precursors for preparing components of high-temperature resistant ceramic composites based on silicon carbide modified by mixed carbides of refractory metals (Hf and Ta).

Biography

Mariya Blokhina is a Researcher of the State Research Institute for Chemistry and Technology of Organoelement Compounds. Her scientific interests cover synthesis, structure and reactivity of nanometallopolycarbosilanes, as well as ceramic composite components produced materials on their basis.

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