MODIFIED SILICON-CARBIDE CERAMICS BASED ON NANOHAFNIUMCARBOSILANES

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The regularities of the formation of ceramic phases of silicon carbide modified by hafnium compounds during the thermal transformation of nanohafniumcarbosilanes (I) under various conditions were investigated. It is found that the thermochemical transformation of nanohafniumcarbosilanes at 1500 °C in different media (nitrogen, argon, air, vacuum) leads to the formation of ceramics, which differs not only in chemical composition but also in surface morphology.

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\text{HfC} + \text{SiC} + \text{CH}_4 + \text{H}_2 + \text{C}_2\text{H}_4 + \text{C}_2\text{H}_6
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X-ray diffraction pattern of a ceramics 1500 °C (A – in argon; B – in nitrogen) produced from a n-HfOCS: (1) calculated profile, (2) raw data, (3) difference plot

X-ray diffraction pattern of a ceramics produced from a n-HfOCS 1500 °C in a vacuum: basic phases – HIC and β-SiC

X-ray diffraction pattern of a ceramics produced from a n-HfOCS 1500 °C in air: basic phases – SiO₂ and SiC

X-ray diffraction pattern of a ceramics produced from a n-HfOCS (Hf > 10 wt. %) 1500 °C in nitrogen: phases – SiC and Si₃N₄ (nierite)