Oxidation of Mixed Borides, Nitrides, and Carbides

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The oxidation behavior of pure HfB_2, HfN, and HfC has been described previously. A systematic study of the scale formation on mixed systems, primarily focusing on HfB_2-HfN_x materials, will be described. Materials in the Hf-N-B system have shown unique microstructural features, most notably the formation of acicular HfB_2 grains in ternary compositions. The effects of the composition and microstructure in static-air furnace oxidation tests and high-temperature TGA experiments will be reported. Results from arc-jet testing of a variety of mixed nonoxide compositions (HfC, HfB_2, or HfN with each other and alloyed with TaC, TaB_2, WC, or WB) will also be detailed.