Reactions of Niobium Silicide Melt with Refractory Ceramics

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Abstract—Vaporization of a multicomponent Nb–Si-based melt with ceramic materials containing yttrium, zirconium, hafnium, and gadolinium oxides is studied. The high-temperature reactions of the alloy and ceramics at 1795–2510 K involve reduction of yttrium, zirconium, hafnium, and gadolinium oxides, accompanied by an increase in the partial pressures of GdO, YO, ZrO, and HfO compared with the partial pressures of the same oxides over individual ceramic samples. Ceramics oxidized titanium, silicon, aluminum, and niobium to oxides.

Keywords: high-temperature mass spectrometry, vaporization processes, niobium−silicon alloy, refractory ceramics

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