

# Electrochemical Synthesis of Niobium-Hafnium Coatings in Molten Salts

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Graphite is widely used in technology because of its unique properties. A drawback of graphite is its low heat resistance in oxidizing atmospheres. To increase its heat resistance, Nb-Hf protective coatings were synthesized. Electrodeposition of niobium coatings on graphite with subsequent precise surface alloying of niobium with hafnium was studied. Electrochemical synthesis of Nb-Hf coatings from molten salt systems containing compounds of niobium and hafnium was used too. It was shown that Nb-Hf coatings with a planar growing front can be obtained if the concentration and therefore the limiting current density of the more electropositive component Nb is kept low. Nb-Hf coatings with a thickness of 20–30  $\mu\text{m}$  have been obtained in this way from an NaCl-KCl-K<sub>2</sub>NbF<sub>7</sub> (1 wt%)-K<sub>2</sub>HfF<sub>6</sub> (10 wt%)-NaF (5 wt%) melt, above the limiting current density of niobium deposition.

*Key words:* Graphite-Based Compositions; Heat Resistance; Protective Coatings; Precise Surface Alloying; Electrochemical Synthesis.