

## On the formation of niobium carbide ceramics

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### **Resumo:**

High hardness in a wide temperature range make niobium carbide ceramics useful for high temperature wear-resistant applications. For the preparation of such materials the use of preceramic polymers offer new opportunities of manufacturing composites at temperatures below 1500C. For the preparation of Nb containing composites NbC has been used as inert filler, Nb as reactive filler, and a commercial methyl(polysiloxane) as preceramic polymer. Pyrolysis was carried out at 1200 and 1400C in argon. Phase formation was followed up by XRD, SEM and EDAX element mapping. Density and porosity were measured by He pycnometry and Hg porosimetry. For the mechanical characterization flexural strength and indentation measurements were carried out. Whereas at 1200C pyrolysis temperature the hardness increased by increasing Nb content in the ceramic, at 1400 C the hardness decreased drastically. For this effect the formation of niobium silicide compounds and the formation of niobium oxide by the reaction with oxygen from the decomposed poly(siloxane) is responsible. In this paper the reaction mechanisms and the resulting mechanical properties are discussed.