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عنوان مقاله:

In Situ Formation of SiC/CNT Ceramic Nanocomposite by Phenolic Pyrolysis

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خلاصه مقاله:

In this research, using pyrolysis of phenolic resin in the presence of silicon particles, the SiC ceramic composite is formed. The samples were prepared by introducing 30, 35, 40, 45 and 50 wt% of Si particles to the phenolic resin. The samples were cured at 180°C then carbonized at 1100°C. The final carbonized C/Si composites are hot-pressed at 1500°C in inert atmosphere, which is more than the melting point of Si particles. In this temperature, Carbon vapor and melted Si react and SiC ceramic is formed. The XRD analysis of samples showed that SiC peak was observed in the final product while carbonized phenolic and Si particles also existed in the matrix. The samples were so brittle and therefore, several impregnation processes should have been used to reduce the porosity of composite. SEM images of in situ composite reveal extraordinary phenomenon which is related to the formation of CNT and nanostructures on the base of Si particles that grow like flower in the matrix. These nanostructures are one of the reasons for higher mechanical properties of final nanocomposite. Three-point flexural tests are also conducted for better understanding .of mechanical improvement

کلمات کلیدی:

In situ formation, CNT, Nanocomposite, Silicon particles, Pyrolysis

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