Diamond synthesis at high filament temperature

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ABSTRACT

Diamond particles and films have been deposited on silicon wafer by using hot filament assisted chemical vapour deposition (HFCVD). Tantalum carbide filaments were used in the temperature range of 2700-2890°C. The filament can be repeatedly used for diamond deposition in CH₄/H₂/O₂ atmosphere without deformation in its geometry. Diamond structure was deposited at high methane concentration up to 12% at filament temperature of 2890°C. By introducing 5.6% of oxygen, the methane concentration can be extended to 16%. Diamond particles and films were characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD) and Raman spectroscopy.