Contribution ID : **59** Type : **Oral Presentation**

Dependence of Thermal Conductivity of MPCVD Diamond Thin Films on Oxygen Concentration

Monday, 13 August 2018 17:30 (15)

There are various applications for which diamond thin films (DTFs) have gained attention due to their unique physical properties including good optical properties, high thermal conductivity, high electrical conductivity etc. The most prominent among all is the high thermal conductivity of diamond which makes it a potential candidate for heat spreading and other such applications in the field of electronics. To date, various methods have been introduced to enhance the above mentioned properties of the diamond thin films which typically involve doping, and variation in process parameters. In presented study, a series of DTF samples was prepared at 750℃ with different oxygen concentrations. Microwave plasma chemical vapour deposition (MPCVD) method was used for sample preparation at different process parameters (H2 flowrate (99 sccm), CH4 flowrate (1 sccm), Power (600W), Gas pressure (20 Torr), substrate temperature (750℃), deposition time (24 hours)), which were kept constant during film deposition. The effect of variation in oxygen concentration on structural, morphological, and thermal transport properties of diamond have been studied. For structural analysis of the prepared samples, Raman spectroscopy was used which confirmed the formation of good quality DTFs. The addition of oxygen to the growth enhanced the crystallinity and morphology of the samples which was revealed by scanning electron microscopy (SEM). Moreover, morphological analysis showed that the growth of the (100) facet was enhanced for DTFs prepared at low oxygen concentration. Sample thermal conductivity was also analysed by utilizing Raman thermography and these results were correlated against growth conditions. It was found that, the structural features, morphology and thermal conductivity of the samples were correlated with each other.

Primary author(s) : Ms TUZ ZAHRA, Fatima (Macquarie University, NSW 2109, Australia); Dr DOWNES, James (Macquarie University, NSW 2109, Australia)

Presenter(s) : Ms TUZ ZAHRA, Fatima (Macquarie University, NSW 2109, Australia)

Session Classification : Speaker Sessions and Seminars

Track Classification : Thin Film