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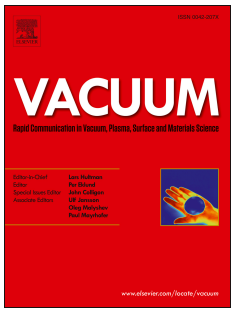

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Application of Dual Radio Frequency Inductive Coupled Plasma into CVD Diamond Growth

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Abstract

Diamond films have been deposited by a tandem type of radio frequency inductive coupled plasma jet source with the maximum deposition time of 150 hours. The morphology, impurity and crystal structure of the deposited films were characterized. By controlling the feed gas composition, nano- and micro-crystal diamond films were deposited on silicon substrates without any metal impurity detected, and the single crystal diamond film was deposited on a diamond substrate with regular crystal lattice structure. Plasma diagnosed by optical emission spectra revealed that this plasma jet source possessed of the high values of the electron temperature (averaged at 2.2eV) and the plasma density (averaged at $4.0\times10^{16}/cm^3$), as well as the stable plasma composition fitting for the diamond growth.

Keywords

Diamond; Chemical vapor deposition; Dual radio frequency; Plasma characterization; Crystal growth

Diamond produced by chemical vapor deposition (CVD) has showed a wide range of potential