Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Growth morphology of boron doped single crystal diamond SUNIL KARNA, YOGESH VOHRA, UAB, Birmingham AL — The growing demand of wide band semiconductors entice researcher to investigate electronic properties in diamond. The chemical vapor deposition (CVD) method has shown that various level of doping can be possible in diamond films. The purpose of this study was to investigate the growth morphology and quality of boron doped diamond film with deposition parameters. Various level of boron doped diamond films were synthesized epitaxially on synthetic (100) ib type diamond substrate using microwave plasma assisted CVD. The structural, optical and electrical characterizations were made to study effect of deposition parameters and pretreatment of substrates on surface morphology and growth quality. Raman spectra showed shape modification of the zone center optical phonon line and its downshift with the increasing boron content in the film. Additional bands were also observed in lower wavelength region below optical phonon line. Surface modification of films with increasing boron content has been observed in atomic force microscopy. High growth rate and high quality films were obtained with the addition of a few ppm of nitrogen in feed gas during deposition with little compromise on conductivity. Electrical measurement showed carriers have been transported via two different conduction mechanisms.

Sunil Karna
UAB, Birmingham AL

Date submitted: 14 Nov 2012 Electronic form version 1.4