

R. Sharma, V. Kumar, V. Chatterjee, N. Woehrl and V. Buck

Field emission study of nanocrystalline diamond films using STM

ABSTRACT. A field emission study of nanocrystalline diamond (NCD) films, synthesized using microwave plasma-enhanced chemical vapour deposition, has been carried out. Films were deposited from an Ar/H₂/CH₄ plasma at 200 mbar and 600 °C on n-type (100) silicon wafers with microwave power varying from 600 to 1600 W. Raman and FTIR spectra and XRD confirmed the formation of NCD. Surface morphology was examined using AFM in lateral force mode. Field emission was studied using scanning tunneling microscopy. Variations in emission current were related to grain size variation and the complex grain boundaries within the NCD films.

Keywords: microwave PECVD, scanning tunneling microscopy

Nanotechnology Perceptions **18** (2022) 36–45

doi: 10.4024/N10SH21A.ntp.18.01