

Anomalous Behaviour of Surface Brillouin Scattering in Thin Strained CVD Diamond

I. Motochi,

Dept. of Mathematics and Physical Sciences,
Maasai Mara University, P.O Box 861-20500, Narok, Kenya.
motochi@mmarau.ac.ke

ABSTRACT

Ion-implantation introduces stresses and strains in the implanted region of any crystal. The material may be healed through annealing, for diamond it has been noted that annealing may bring about recrystallization as long as the fluence did not exceed the critical density. A single crystal CVD was irradiated with carbon ions at a fluence of 1.5×10^{16} ions/cm² at single energy of 150 keV, and annealed above 1000 °C. This treatment results in permanent damage at the end of range. The film above the damaged layer should recrystallize to diamond hence the study sought through Brillouin light scattering to show that the film is indeed diamond. TRIM, FEM simulations, UVVIS-NIR, Raman spectroscopy and BS were employed as characterization and investigative techniques. The results show an anomalous behaviour which was attributed to among others the scattering volume of the film and density variation. Further work is therefore recommended to prove that unlike Si and Ge, diamond actually completely recrystallizes upon annealing for below critical damage.

Key words: *ion-implantation, Brillouin scattering, diamond, recrystallization*