

Spectroscopy Letters 2016 vol.49 N1, pages 5-10

Carbonization in boron-ion-implanted polymethylmethacrylate as revealed from Raman spectroscopy and electrical measurements

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Abstract

© 2016 Taylor and Francis Group, LLC. The results of Raman spectroscopy and electrical measurements of 40 keV boron-ion-implanted polymethylmethacrylate with ion doses from 6.25×10^{14} to 5.0×10^{16} ions/cm² are reported for the first time. The Raman spectra recorded in the 400-3800 cm⁻¹ range, showing the formation of new carbon-carbon bands for the as-implanted samples at higher ion doses ($>10^{16}$ ions/cm²), are found to be an additional support for carbonization processes earlier revealed by slow positrons. The current-voltage dependences at 360 K testify also that the as-implanted samples examined with higher fluences (3.75×10^{16} and 5.0×10^{16} ions/cm²) have created a very thin conductive layer or conductive joints due to carbonization.

<http://dx.doi.org/10.1080/00387010.2015.1044113>

Keywords

Carbon clusters, conductive layer, ion implantation, polymethylmethacrylate, Raman spectra