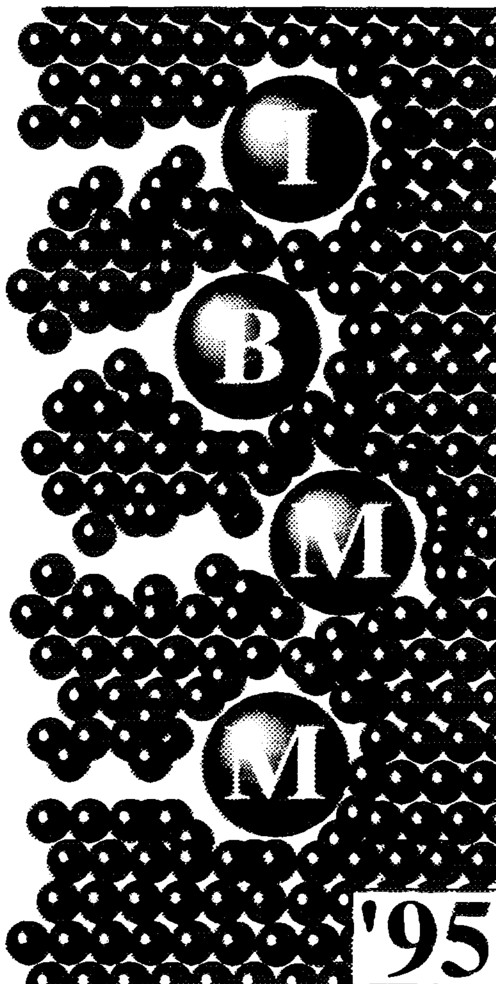
INIS-AU--0004

AU9716201

Ninth International Conference
on
Ion Beam Modification of Materials

BOOK OF ABSTRACTS



Ion
Beam
Modification
of
Materials

Canberra, Australia

5-10 February 1995

AU9716442

Anomalous Surface Damage Production during High Energy Implantation Analysed by Ellipsometry and RBS

T. Lohner[1], M.A. El-Sherbinny[1,*], N.Q. Khánh[1], M. Fried[1], H. Wormeester[2] and J. Gyulai[1]
[1]Research Institute for Materials Science, P.O.B. 49, H-1525 Budapest, Hungary
[2]Faculty of Applied Physics, University of Twente, P.O.B. 217, 7500 AE Enschede, The Netherlands
*On leave from Faculty of Science, Al-Azhar University, Cairo, Egypt

The anomalous surface formed in silicon by room temperature Si, Ar and Kr implantation has been examined using a multilayer optical model. This unexpected disorder is far from the projected range and it is not predicted by TRIM calculation. Ion implantations were performed in the range of 200 - 800 keV. For the analysis of ellipsometric data we used the method of assuming an optical model, applying effective medium approximation and fitting the model parameters (layer thicknesses and volume fractions of amorphous silicon component in the layers) by linear regression. The dependence of the thickness of the damaged surface layer on the implantation parameters was determined. A comparison was made between spectroscopic ellipsometry and multiple-angle-of-incidence single wavelength ellipsometry to check their capability to investigate surface damage. The optical model construction was independently checked by Rutherford Backscattering Spectrometry. A tentative model is outlined explaining the formation of anomalous surface disorder.