

文献

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Dielectric function of disorder in high-fluence helium-implanted silicon
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^a Research Institute for Technical Physics and Materials Science, P.O. Box 49, H-1525 Budapest, Hungary

^b University of Tours, Laboratoire de Microélectronique de Puissance, 16, rue Pierre Marie Curie, F37071 Tours Cedex, France

抄録 (Abstract)

Dielectric function of disorder in single-crystalline silicon (c-Si) implanted by He with energy of 40 keV and fluences from 1×10^{16} to 1×10^{17} cm⁻² were determined around the E1 and E2 critical points (CPs) by spectroscopic ellipsometry. The implanted material was modeled by an effective medium composition of c-Si and damaged Si. The dielectric function of damaged Si was calculated using the model dielectric function of Adachi to fit the E1 and E2 CP parameters of the MDF. The penetration depth of light in the photon energy range of 3-5 eV is less than 100 nm, which allows a simple layer structure of (surface oxide)/(surface amorphous layer)/(c-Si + damaged Si as a substrate). The oscillator energies and strengths decrease, while the broadening parameters increase with increasing fluence. Rutherford backscattering spectrometry was used for cross-checking of the surface disorder. © 2006 Elsevier B.V. All rights reserved.

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