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Chairs

S. Ashok
Electronic Matls & Processing Research Lab
Pennsylvania State Univ
212 EES Building
University Park, PA 16802
814-863-4588

Noble M. Johnson
Electronic Materials Lab
PARC
Palo Alto, CA 94304
415-812-4160

Jacques P. Chevallier
Lab de Phys des Solides
et de Cristallogenese
CNRS
Meudon, 92195 FRANCE
33-1-4507-5340

Bhushan L. Sopori
National Center for Photovoltaics
Natl Renewable Energy Lab
MS 3215
Golden, CO 80401
303-384-6683

Hideyo Okushi
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Electrotechnical Lab
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81-288-615226

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*Invited paper
HYDROGEN PENETRATION AND REDISTRIBUTION DURING AND AFTER CHEMICAL ETCHING OF SILICON. Nicola Yarykin, Oleg Fedosov, Institute of Low Temperature Physics and Engineering, National Academy of Sciences of Belarus, Lugansk, U.S.S.R.

Hydrogen penetration into silicon during wet chemical etching and its redistribution and formation of complexes with other defects during subsequent electrical/thermal treatments is investigated both experimentally and by computer simulation. Experimentally, the CV-profiles of net dopant concentrations were performed on Schottky diodes prepared on hydrogenated samples, and depth distributions of electrically active hydrogen-related centers were measured by the DLTS technique. The simulation program took into account the diffusion of hydrogen in different charge states and its interaction with other defects. It is established that the unknown conditions at the etching surface prevent the unambiguous determination of the hydrogen diffusivity from the fitting of the simulated depth profiles to the final hydrogen complex profiles, which are usually measured experimentally. However, the detection of relaxation of the atomic hydrogen distribution after termination of the chemical etching process, allows us to estimate the concentration of mobile hydrogen near the surface and to determine the hydrogen diffusivity, which is close to the value extrapolated from the high-temperature experiments. From the fitting procedure a capture radius for the boron-hydrogen pair formation is calculated, which is close to the previously reported values and implies that electronic interaction governs the reaction. In contrast, the effective distance for hydrogen interaction with donors (including phosphorus as well as oxygen- and nitrogen-related thermal donors) in p-type silicon is much shorter than expected from the currently accepted structure of the energy levels of isolated hydrogen in silicon.

EVOLUTION OF NUCLEATION SITES AND BUBBLE PRECURSORS IN SILICON AS A FUNCTION OF HELIUM IMPLANTED DOSE. Cheng-kong Liu, R. Delorme, E. Nuczczek, CCHL, CNRS, Université de Lyon, Villeurbanne, France; E. Payselet, Laboratoire de Physique des Solides et de Cristallinogenèse, CNRS, Meudon, France; S. Silvestre, D. Loridant-Bernard, L. Kurovski, E. Constant, Institut d’Électronique et de MicroÉlectronique du Nord, CNRS, Villeneuve d’Ascq, France; M. Leblanc, Laboratoire de Spectrochimie Infrarouge et Raman, CNRS, Université des Sciences et Technologies de Lille, Villeneuve d’Ascq, France.

Our study of the emission from helium implanted silicon shows the formation of vacancy-like clusters and bubbles in the low dose and bubbles or cavities in the higher doses. The formation of vacancy-like clusters in the low dose He implanted samples are further confirmed by the measurements of positron annihilation spectroscopy (PAS). These vacancy-like clusters act as the precursors of bubbles forming at high dose. The results are qualitatively discussed. Key words: helium, XTEM, bubbels, dislocation loops, vacancy-like defects.

PARTIAL ANNEALING OF DEFECTS IN BORON-IMPLANTED P-TYPE SILICON BY HYDROGEN IMPLANTATION. Yutaka Tokuda, Aichi Institute of Technology, Dept. of Electronics, Toyota, JAPAN; Hiroshi Inuchi, Aichi Institute of Technology, Research Institute for Industrial Technology, Toyota, JAPAN.

We have shown the partial annealing of electron traps in phosphorus-implanted n-type silicon by subsequent hydrogen implantation [1]. In this study, the effects of hydrogen implantation on hole traps produced in p-type silicon by boron implantation have been studied by deep-level transient spectroscopy (DLTS). Schottky contacts were fabricated by evaporation of Ti on implanted surfaces for DLTS measurements. A peak annealing temperature of about 100°C produces a removal of 1016 cm−2 at 105 V. A peak annealing temperature of about 100°C produces a removal of 1016 cm−2 at 105 V. A peak annealing temperature of about 100°C produces a removal of 1016 cm−2 at 105 V. A peak annealing temperature of about 100°C produces a removal of 1016 cm−2 at 105 V. A peak annealing temperature of about 100°C produces a removal of 1016 cm−2 at 105 V.