

## PLASMA ION IMPLANTATION OF NITROGEN INTO SILICON: HIGH RESOLUTION X-RAY DIFFRACTION

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In the present study we use x-ray diffraction methods to characterize the surface of samples irradiated with nitrogen by Plasma Immersion Ion Implantation. PIII is a novel technique developed for the improvement of the surface of materials. It is a non-line-of-sight ion implantation method which allows three-dimensional treatment of manufactured workpieces, at high speed and low costs [1]. The effects of nitrogen plasma etching during the implantation process was studied as a function of the controlled plasma potential by profilometry in Si wafer. The (004) Si rocking curve ( $\omega$  scan) was measured in a high resolution diffractometer equipped with a Ge(220) four-crystal monochromator before and after each implantation. The modification of the (004) rocking curve of the as-implanted samples showed that Si wafers can be used as high sensitivity monitors in the PIII process, specially at the low dose range. The analysis made by x-ray diffraction and Auger electron spectroscopy revealed successful implantation of ions with accumulated nitrogen dose of  $1.5 \times 10^{17} \text{ cm}^{-3}$ .

[1] J.R. Conrad et. al., *J. Appl. Phys.* **62**, 4591 (1987)