

Electrical characteristics of silicon nitride on silicon and InGaAs as a function of the insulator stoichiometry

A. Piccirillo; A.L. Gobbi; P.E. Bagnoli; R. Giannetti

Abstract-

The interface state density along the semiconductor energy gap and the fixed charge were evaluated in SiN_x/InGaAs and SiN_x/Si interfaces. The insulator layer was deposited by plasma-enhanced chemical vapour deposition (PECVD) using several ammonia / silane gas ratios. In both the samples the measurements revealed two main peaks of interface states whose height is a function of the insulator layer stoichiometry. Further analysis by infrared and Auger electron spectroscopy and electron spin resonance measurements enabled the peaks to be identified as the two silicon-related defects in silicon nitride cited in the literature. The nitrogen dangling bonds were found to affect the fixed charge of the structure. The role of hydrogen in passivating silicon and nitrogen dangling bonds will also be discussed.

Index Terms-

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to Applied Surface Science, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Bagnoli, P.E.; Giannetti, R.; Gobbi, A.L.; Piccirillo, A. "Electrical characteristics of silicon nitride on silicon and InGaAs as a function of the insulator stoichiometry", Applied Surface Science, vol.52, no.1-2, pp.45-52, October, 1991.