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INTERFACIAL STRUCURE OF OXYNITRIDE LAYER ON SI(100) WITH PLASMA-EXCITED N_2O

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ABSTRACT

Silicon oxynitride films have been grown on Si(100) wafer with plasma-excited nitrous oxide (N_2O) gas, which has a low toxicity in comparison with other oxynitridation agents. Reaction rates are investigated by Auger electron spectroscopy, and compared with those grown with non-excited N_2O gas. Si 2p core-level photoelectron spectroscopic measurements using synchrotron radiation have been also carried out to investigate interfacial structures of the grown oxynitride layers. Temperature dependences of chemical-shift components of the obtained Si 2p spectra show that the interfacial roughness decreases with reaction temperature. Distributions of the suboxide components are discussed in accordance with results of angle-resolved Si 2p spectra.

KEYWORDS: Chemical Shift, Core-Level Photoelectron Spectroscopy, Gate Insulator, MOS FET, N_2O Gas, Plasma Excitation, Silicon Oxynitride