metal-oxide-silicon-on-insulator 구조에서 고정 산화막 전하가 미치는 영향

조영득[1], 김지홍[2], 조대형[2], 문병무[2], 고중혁[1], 하재근[1], 구상모[1]
[1]광운대학교, [2]고려대학교

Effect of the fixed oxide charge on the metal-oxide-silicon-on-insulator structures

Yeong-Deuk Jo[1], Ji-Hong Kim[2], Dae-Hyung Cho[2], Byung-Moo Moon[2], Jung-Hyuk Koh[1], Jae-Geun Ha[1], and Sang-Mo Koo[1]
[1]Kwangwoon University, [2]Korea University

Abstract : Metal-oxide-silicon-on-insulator (MOSOI) structures were fabricated to study the effect caused by reactive ion etching (RIE) and sacrificial oxidation process on silicon-on-insulator (SOI) layer. The MOSOI capacitors with an etch-damaged SOI layer were characterized by capacitance-voltage (*C-V*) measurements and compared to the sacrificial oxidation treated samples and the reference samples without etching treatment. The measured *C-V* curves were compared to the numerical results from 2-dimensional (2-D) simulations. The measurements revealed that the profile of *C-V* curves significantly changes depending on the SOI surface condition of the MOSOI capacitors. The shift in the measured *C-V* curves, due to the difference of the fixed oxide charge (Q_f), together with the numerical simulation analysis and atomic force microscopy (AFM) analysis, allowed extracting the fixed oxide charges (Q_f) in the structures as well as 2-D carrier distribution profiles.

Key Words : etch damage, interface states, *C-V*, Silvaco Atals, AFM