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Changes in surface chemical structure of BF_3 plasma doped $Si_{0.7}Ge_{0.3}$ films JINWON MA, WOO-JUNG LEE, JUNGMIN BAE, SEUNGHOON OH, JEONGHUN KIM, YUSEON KANG, MANN-HO CHO, DAEHONG KO, Yonsei Univ, YONGSEO AHN, HYUNGSUB KIM, Sungkyunkwan University, SNAG-IL SEO, NAM-HUN KIM, Adaptive Plasma Technology Corp., DEPARTMENT OF MATERIAL SCIENCE AND ENGINEERING, YONSEI UNIVERSITY TEAM, SUNGKYUNKWAN UNIVERSITY COLLABORATION, ADAPTIVE PLASMA TECHNOLOGY CORP. COLLABORATION — Ultra shallow junctions were formed using BF_3 plasma doping process in $Si_{0.7}Ge_{0.3}$ films. The damaged Si_xGe_y layer of a few Å was observed in near surface region of doped $Si_{0.7}Ge_{0.3}$ films, which increased especially the interfacial germanium oxide states. While the surface oxide layer of as-grown $Si_{0.7}Ge_{0.3}$ film was mainly composed of silicon oxide, the oxide layers of doped $Si_{0.7}Ge_{0.3}$ films were largely composed of germanium oxide. It is reported that the interfacial GeO_{2-x} states are related with the interfacial defect states. In the doped films, however, GeO_{2-x} states were decreased after rapid thermal annealing (RTA) process. In especially, after RTA of doped sample with process conditions of 300 W and 30 s, it is shown that the formation of interfacial defect states were significantly decreased, which was caused by the Ge-F bond generated on the SiGe surface.

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