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Atmospheric-Pressure Plasma Oxidation Process for Passivation of Si Surface ZE TENG ZHUO, TAKAYUKI OHNISHI, KAZUMA GOTO, YUTA SANNOMIYA, HIROMASA OHMI, HIROAKI KAKIUCHI, KIYOSHI YASUTAKE, Department of Precision Science and Technology, Graduate School of Engineering, Osaka University, 2-1 Yamada-oka, Suita, Osaka 565-0871, Japan — Surface passivation films on Si wafers have been prepared by atmospheric-pressure (AP) plasma oxidation technique. Optical emission spectroscopy of O_2/He AP plasma revealed that SiO_2 films were obtained at high oxidation rate under the condition with high O emission intensity. From the MOS CV measurements of obtained SiO_2/Si interface, the interface state density (D_{it}) and the fixed oxide charge density (Q_f) were in the range of (4–20) $\times$ 10^{10} cm^{-2}eV^{-1} and (5–20) $\times$ 10^{11} cm^{-2}, respectively. According to the model calculation on surface recombination velocity (S) demonstrated that the obtained Q_f was sufficient to significantly reduce S for n-type Si with SiO_2 layer prepared by AP plasma oxidation.

Ze Teng Zhuo
Dept of Precision Science and Technology,
Graduate School of Engineering, Osaka University,
2-1 Yamada-oka, Suita, Osaka 565-0871, Japan

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