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A role of low pressure plasma discharge on etch rate of SiO_2 dummy wafer VLADIMIR MILOSAVLJEVIC, NCPST-School of Physics, DCU, Dublin, Ireland; Faculty of Physics, University of Belgrade, Serbia, ANDRJANA ZEKIC, DUSAN POPOVIC, Faculty of Physics, University of Belgrade, Serbia, NIALL MACGEARAILT, STEPHEN DANIELS, NCPST, DCU, Dublin, Ireland — Plasma has become indispensable for advanced materials processing, also low–k materials as SiO_2 play important role in semiconductor industry. In this work a treatment of SiO_2 single crystal by DC plasma discharge is studied in details. There are many effects occurred during plasma–surface interactions. Our work is focused on interaction between ions and dielectric surface. The etch rates, surface morphology and chemical composition of modified surface layer obtained by DC plasma etching are reported. Influence of plasma chemistry (SF_6, O_2, N_2, Ar and He), discharge voltage (up to 1.2 kV), gas flow (up to 25 sccm, for each gas) and electrode–wafer geometry on etch rate of SiO_2 wafer have been studied. Offline metrology is conducted for SiO_2 wafer by SEM/EDAX technique and Raman scattering. Broad Raman peak at around 2800 cm^{-1} is observed for both, treated and original, investigated SiO_2 wafers. Effects of plasma treatment conditions on integrated intensity of this peak are reported in the paper. An analysis of this correlation could be a framework for creating virtual etches rate sensors, which might be of importance in managing of plasma etching processes.

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