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Impact of low pressure plasma discharge on etch rate of SiO<sub>2</sub>wafer DUSAN POPOVIC, VLADIMIR MILOSAVLJEVIC, ANDRIJANA ZEKIC, Faculty of Physics, University of Belgrade, NIALL MACGEARAILT, STEPHEN DANIELS, National Centre for Plasma Science and Technology, Dublin City University, Dublin-9, Ireland — 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. 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<sub>6</sub>, O<sub>2</sub>, N<sub>2</sub>, 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. Effects of plasma treatment conditions on integrated intensity of broad Raman peak at around  $2800 \text{cm}^{-1}$  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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