

Abstract Submitted
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Effect of TCP Pulsing in Photon Induced Sub-threshold Etching of Si JULINE SHOEB, SARAVANAPRIYAN SRIRAMAN, TOM KAMP, ALEX PATERSON, Lam Research Corporation — With decrease in device sizes, plasma damage minimization of Si becomes very important. During over-etch processes a passivation layer protects Si from ions. Even below etching threshold energy, UV photons can cleave Si-Si bonds that acts as a precursor for Si etching. In HBr/He/O₂ plasmas, 58.4nm photons from He(2¹p) and 130nm photons from O(3s) can result in sub-threshold etching of Si by Si-Si bond cleaving followed by Si etching as volatile SiBr₄.¹ Literature reports reduction in UV damage with ICP power pulsing.² During pulse-off period, electron temperature drops thereby reducing meta-stable densities responsible for photon emission. Reducing radical and ion density and photon fluxes, pulsed plasmas possibly can reduce sub-threshold Si etching.³ In this talk, a comparison of sub-threshold damage of Si between continuous and pulsed HBr/He/O₂ plasmas using modeling and experiments will be presented.

¹J. Shoeb, S. Sriraman, T. Kamp, and A. Paterson, 65th GEC, Austin TX, (2012).

²C. P. Etienne, et. al., J. Vac. Sci. Technol. B **31(1)**, (2012).

³Ibid.

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