Abstract Submitted
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Mechanisms of Hydrocarbon Based Polymer Etch BARTON LANE, PETER VENTZEK, Tokyo Electron America, MASAAKI MATSUKUMA, AYUTA SUZUKI, TEL Technology Development Center, Yamanashi, AKIRA KOSHIISHI, TEL Process Module Technology Department, Miyagi — Dry etch of hydrocarbon based polymers is important for semiconductor device manufacturing. The etch mechanisms for oxygen rich plasma etch of hydrocarbon based polymers has been studied but the mechanism for lean chemistries has received little attention. We report on an experimental and analytic study of the mechanism for etching of a hydrocarbon based polymer using an Ar/O2 chemistry in a single frequency 13.56 MHz test bed. The experimental study employs an analysis of transients from sequential oxidation and Ar sputtering steps using OES and surface analytics to constrain conceptual models for the etch mechanism. The conceptual model is consistent with observations from MD studies and surface analysis performed by Vegh, et al. and Oehrlein, et al. [1,2] and other similar studies. Parameters of the model are fit using published data and the experimentally observed time scales.

[1] J.J. Vegh, D. Nest, D. B. Graves, R. Bruce, S. Englemann, T. Kwon, R. J. Phaneuf, G. S. Oehrlein, B. K. Long, and C. G. Willson, Jour. of Applied Physics **104**, 034308 (2008).
[2] G.S. Oehrlein, R. J. Phaneuf, D. G. Graves, J. Vac. Sci. Tech. B 29, 010801-1 (2011).

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