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Plasma-Surface Interactions With Advanced Polymers For Nanoscale Patterning Of Materials¹

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Photolithography and plasma-based transfer of resist patterns to produce devices are the basis of the information technology, and other technologies where patterned films or substrates are needed. The most highly developed is the silicon integrated circuit industry, which employs plasmabased etching to produce device features with precisely controlled nanoscale dimensions. Given the tremendous success of this technology, it is surprising that one of the least understood elements of this approach remains the interaction of the plasma species with the organic molecules arranged either as a blanket film or a nanoscale pattern, and the chemical, morphological and topographic changes induced by these interactions in the macromolecules themselves and the macromolecule defined nanoscale features. In this talk we review recent work aimed at improving our understanding and control of plasma-surface interactions with advanced polymers for nanoscale patterning of materials. Based on collaborations with S. Engelmann, R. L. Bruce, T. Kwon, R. Phaneuf, Y. C. Bae, C. Andes, D. Graves, D. Nest, J. Vegh, E. A. Hudson, B. Long, G. Willson, P. Lazzeri, E. Iacob and M. Anderle.

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