

Abstract Submitted
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Fast silicon etching by plasma-sheath-lens focused negative ions¹

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— Plasma processing technologies are based on radical-assisted, ion-induced surface modifications where ions accumulate energy within the sheath then strike the surface with a certain energy and incidence angle. Since reliable information on etching yields and a precise control of reactive species are of critical importance in attaining the desired process the use of plasma-sheath-lens and its discrete and modal focusing effects [1] can bring certain advantages (identical environment with that of real plasma processing; wide range of ion energies at high current densities; the passive surface can be used as a reference or as a collection surface of byproducts). Despite of high etching rates provided by high-density plasmas there are yet unsolved problems which can be avoided by bringing electrons to the bottom of the features, a case in which the etching needs to be performed by negative ions. In this work square and disk electrodes made of silicon have been exposed to different incident fluxes of negative ions focused by a plasma-sheath-lens. The etching pattern resulted by discrete and modal focusing effect was measured by phase-shift laser interferometry and compared with that from simulation performed for similar parameters.

[1] E. Stamate and H. Sugai, Phys. Rev. Lett. 94 (2005) 125004.

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