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Negative Ions and Neutral Beams in Plasma Etching VLADIMIR

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A major problem in etching processes for future nanoscale devices is charge build-up due to the electron shading phenomenon. One possible solution of this problem is to use beams of energetic neutral atoms instead of positive ions in etching. The neutral beam can be produced by generating negative ions which are accelerated toward a substrate and then neutralized¹. This paper presents research aimed at diagnosing and understanding electronegative plasmas. Techniques for measuring negative ion density by laser photodetachment and electrical probes are presented together with preliminary results in SF₆ pulsed rf plasmas. The results will be compared with those from a global model².

¹ S. Samukawa, Jpn. J. Appl. Phys. **45**, 2395 (2006).

² Y. T. Lee, M. A. Lieberman, A. J. Lichtenberg, F. Bose, H. Baltes, and R. Patrick, J. Vac. Sci. & Tech. A **15**, 113 (1997).

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