

Abstract Submitted
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Energetic Charged Particle Collisions in Electronegative Plasmas SVETLANA RADOVANOV, LUDOVIC GODET, TIMOTHY MILLER, NICHOLAS CHAMBERLAIN, GEORGE PAPASOULIOTIS, Varian Semiconductor Equipment Associates — Plasmas used for ion implantation often contain large amounts of energetic electrons and negative ions. The existence of negative ions affects the transport and spatial distribution of charged particles and the spatial structure of the sheath. This is particularly important in pulsed DC plasmas. Understanding of the basic properties of such electronegative plasmas is important for advanced materials processing. In this paper, we study how secondary electrons affect plasma parameters in BF_3 , and BF_3 mixtures with Ar and He. Electron densities as well as positive and negative ion densities extracted from a radio-frequency inductively coupled discharge are measured during the on and off period of a pulsed DC bias with repetition frequencies between 0.1 and 10 kHz, and voltages of 0.5-10kV at pressures of ~ 1 -100 mTorr. The negative ion to electron density ratio is discussed and evaluated. We also study transitions from the electropositive to the electronegative regime. The effect of conductive and insulating surfaces on plasma conditions is studied as a function of bias voltage.

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