Abstract Submitted
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Ion Concentration vs. Depth Modelling Code for Plasma Ion Implantation[1] MICHAEL BRADLEY, Physics Engineering Physics, University of Saskatchewan, MARCEL RISCH, University of Goettingen — Plasma Ion Implantation (PII) is a technique in which a solid target immersed in a plasma is implanted with energetic ions via the application of a pulsed kilovolt-level negative bias voltage. PII allows implantation of very high ion fluences across broad-area targets. This makes it an ideal technique for many applications, including semiconductor device fabrication. When using PII, it is important to accurately model the resulting ion concentration vs. depth profile. We start with a model due to M.A. Lieberman for dynamic sheath expansion, in which the equation for the time-dependent sheath thickness $s(t)$ is solved numerically for an arbitrary pulse voltage profile $V(t)$ and used to obtain the implanted ion current density $J(t)$. This model must be extended to account for a number of additional effects including collisions in the high-voltage sheath, plasma density enhancement during the high voltage pulse due to the effect of secondary electrons, and plasma depletion in the sheath. This talk will describe the ion concentration vs. depth prediction code which was developed by our group based on this approach.

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