

Abstract Submitted
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Dose Prediction in Plasma Ion Implantation¹ MARCEL RISCH,
MICHAEL BRADLEY, University of Saskatchewan — The exact knowledge of the
plasma ion current, and hence the implanted dose, is essential for materials pro-
cessing, but the measurement of those quantities requires complex instrumentation.
We present the computation of the ion current and dose from the sampled negative
voltage pulse applied to the electrode and plasma parameters obtained by virtue of
Langmuir probe measurements. Firstly, we solved the equations of the Lieberman
model for the sheath width and the plasma ion current, including errors, as a func-
tion of time. Then, integration of the ion current over the duration of the voltage
pulse yielded the dose and its error limits. We will compare the plasma current pre-
dictions to the plasma current measured by a Faraday cup and the dose calculation
will be verified by nuclear reaction analysis (NRA). The numerical methods were
proven fairly accurate and are thus a valuable tool for materials engineering.

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