

Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

Ion induced electron emission from semiconductors: The effect of conduction band electrons and surface electric fields¹ DAVID URRABAZO, MATTHEW GOECKNER, LAWRENCE OVERZET, University of Texas at Dallas — A few recent publications point to the possibility of controlling the ion induced electron emission (IIEE) yield from semiconductor surfaces in real time through controlling the numbers of electrons in the semiconductor's conduction band (n_e, CB). Of course, ion bombardment induced electron emission also occurs in the plasma processing of semiconductors, and should cause differences between processing n- and p-type wafers if it truly depends upon n_e, CB . Hagstrum's Auger neutralization theory for semiconductors assumes that the IIEE yield should NOT depend upon n_e, CB , and as a result most models make the assumption that the IIEE yield is independent of n_e, CB (and the position of the Fermi level as well as temperature). To our knowledge, no one has investigated this assumption! Therefore, we have experimentally and theoretically investigated it by using and extending Hagstrum's theory as well as by measuring the IIEE yield from semiconductor samples versus doping density and type. In addition, we have begun both theoretical and experimental investigations into the effects of a surface E-field on IIEE for semiconductors. We will introduce a device we have designed, modeled, and begun fabricating for measuring the IIEE yield while independently controlling the ion flux and E-field.

¹This material is based upon work supported by the Department of Energy under Award Number DE-SC-0009308.

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Date submitted: 10 Jun 2014

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