

Abstract Submitted
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Ablation of solid materials into discharge plasmas MICHAEL KEIDAR, University of Michigan — Ablation of solid materials plays an important role in capillary discharges, current interrupters, plasma thrusters, laser interaction with targets etc. Kinetics of the ablation into discharge plasma is described. The ablation model takes into account the non-free nature of ablation due to the presence of a high-density discharge plasma. Different characteristic sub-regions near the surface namely space-charge sheath, Knudsen layer, presheath and a hydrodynamic layer are considered. The ablation rate is determined by the flow velocity at the edge of the Knudsen layer. The kinetic approaches namely bi-modal distribution function and direct simulation Monte-Carlo are used to determine the parameters at the interface between the kinetic Knudsen layer and the hydrodynamic layer. Coupling solution of the non-equilibrium, Knudsen layer, with hydrodynamic layer and presheath provides self-consistent solution for the ablation rate. Ablation of the compound materials is considered by taking into account chemical reactions at the surface. Several examples with successful implementation of this model are presented.

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