

An Inelastic Thermal Spike Model to Calculate Ion Induced Desorption Yields

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The ion induced desorption is a serious luminosity limitation for low charge state heavy ion accelerators and is intensively investigated in dedicated experiments. During the last years several desorption yields were measured for different ion beam parameters, different materials and surface treatments. One major result was the identification of the ion-induced desorption to be a surface effect with a strong link to the bulk material properties. Furthermore it was observed that the sample is cleaned by the ion beam and that the total amount of desorbed gas always corresponds to one monolayer under the beam spot. With the geometrical cross section of the projectile ion desorption yields of several hundred molecules per ion impact could not be explained. For a theoretical description we have extended the inelastic Thermal Spike Model by thermal desorption in order to treat ion-induced desorption as a thermally moderated process. The obtained results of this new model are in reasonable agreement with the measured desorption yields. We will present the principal of the model. Variations of the input parameters will be discussed and calculated desorption yields will be compared to various experiments.