

Abstract Submitted
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Surface production of negative ions from nitrogen doped diamond in a deuterium plasma¹ GREGORY SMITH, JAMES ELLIS, University of York, UK, ROBA MOUSSAOUI, CEDRIC PARDANAUD, PIIM, Aix-Marseille University, France, JOCELYN ACHARD, RIADH ISSAOUI, LSPM, Université Paris 13, France, TIMO GANS, JAMES DEDRICK, University of York, UK, GILLES CARTRY, PIIM, Aix-Marseille University, France — The production of negative ions is of significant interest for applications including mass spectrometry, material surface processing, and neutral beam injection. Diamond is of particular interest as it has a large band gap and can have negative electron affinity. Nitrogen doping introduces a deep donor level, thereby increasing the production of negative ions. In this study, we investigate the surface production of negative ions from nitrogen doped diamond via experiments and simulations. Negatively biased, nitrogen doped micro crystalline diamond films are introduced to a low pressure deuterium plasma. Negative ion energy distribution functions (NIEDFs) are measured via mass spectrometry with respect to the diamond surface temperature and dopant concentration, and are compared to simulations to infer the deuterium surface coverage. Mechanisms for the production of negative ions via continuous and pulsed sample biasing, and their influence on the surface structure, are discussed.

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