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Negative ion surface production on carbon materials in hydrogen plasma: a thermodesorption analysis of carbon surface states GILLES CARTRY, KOSTIANTYN ACHKASOV, CÉDRIC PARDANAUD, JEAN-MARC LAYET, PIIM, Aix Marseille University, CNRS, ALAIN SIMONIN, IRFM, CEA Cadarache, ALIX GICQUEL, LSPM, CNRS, Paris-Nord University, OTHMEN SAIDI, RÉGIS BISSON, THIERRY ANGOT, PIIM, Aix Marseille University, CNRS, PIIM COLLABORATION, IRFM COLLABORATION, LSPM COLLABORATION — Negative ion surface production in plasmas has been studied in the context of fusion where H- surface production in cesium-seeded plasmas is of a primary interest for neutral beam injection devices. Although surface production is much lower in Cs-free plasmas, it may be non-negligible. Indeed it has been observed that significant numbers of H- ions can be created on a graphite surface upon positive ion bombardment in H2 plasmas. Graphite material has been compared to a large variety of diamond layers, in particular poly-crystalline boron-doped and non-doped diamond thin films. It has been shown an enhancement of the negative-ion yield by a factor 5 for diamond materials at high temperature, while the yield continuously decreases for graphite. The difference is due to the different properties of the pristine materials but also to the modifications bring by the plasma to the materials during exposure. In order to study in detail these modifications, plasma exposed samples have been analyzed by Raman spectroscopy and Temperature Programmed Desorption (TPD). These diagnostics helped to trace the surface state changes of the materials and identify the reasons for the elevated negative ion production at high temperature on diamonds.

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