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Hydrogen negative-ion surface production on diamond materials in low-pressure H2 plasmas[1] 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, PIIM COLLABORATION, IRFM COLLABORATION, LSPM COLLABORATION — Negative-ion sources producing H- current density of $\sim$ 200 A/m2 are required for the heating of the fusion plasma of the international project ITER. The only up-to-date solution to reach such a high H- negative-ion current is the use of cesium (Cs). Deposition of Cs on the negative-ion source walls lowers the material work function and allows for high electron-capture efficiency by incident particles and thus, high negative ion yields. However, severe drawbacks to the use of Cs have been identified and its elimination from the fusion negative-ion sources would be highly valuable. Volume production is not efficient enough at low-pressure to reach the high current required. Therefore, we are working on alternative solutions to produce high yield of H- negative-ions on surfaces in Cs-free H2 plasmas. In this communication, we will detail the methodology employed to study negative-ion surface production. In particular we will describe how the negative-ions are extracted from the plasma, and how we can obtain information on surface production mechanisms from the measurement of the H- energy distribution functions. We will present some results obtained on diamond surfaces and show that diamond is a promising candidate as a negative-ion enhancer material in low-pressure H2 plasmas.

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