

HTPD 2018



Contribution ID : 177

Type : not specified

4.2 Studies of impurity generation and transport by the line ratio method in TJ-II

Monday, 16 April 2018 20:30 (120)

The fate of impurities launched into the plasma through plasma-wall interaction processes is determined by several basic characteristics of the plasma edge as well as by the nature of the underlying erosion mechanism, such as sputtering or evaporation. Upon a first ionization by electron collisions at the edge, the impurity starts to feel a variety of forces which ultimately determines its transport either to the core (pollution) or back to the wall (screening). Furthermore, the lifetime of plasma-facing materials is critically determined by local redeposition processed taking place near the LFS. In this work, liquid metal samples (Li, LiSn, and Sn) were exposed to TJ-II plasmas in a porous structure (CPS). The analysis of the spectroscopic signatures of Li and Sn, as well as that of their first ions in the visible range, was performed with spatial resolution in radial and toroidal directions by using a set of 16-channel PMs looking at the localized impurity source. From the analysis, the kinetic energy of the ejected neutral species, as well as the thermalization and transport of the resulting ions, is inferred. By using a high recycling impurity as He, injected as an atomic beam, values of the ion temperature profile at the edge are also deduced.

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Session Classification : Session #4, Monday Night Poster Session