

Recent Activities on Plasma Spectroscopy and Atomic Data in KAERI Atomic Data Center

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We have carried out optical emission spectroscopy (OES) in our own capacitively coupled plasma device which can be easily switched to an inductively coupled plasma device. The plasma temperature and density for Ar plasma in the device was been determined by a collisional radiative modeling (CRM) for the neutral Ar (690 – 830 nm) of the weakly ionized Ar plasma and compared with the Langmuir probe measurement (1.2 – 2.2 eV and $4.0 \times 10^9 - 8.0 \times 10^{11} \text{ cm}^{-3}$) in order to test the reliability and uncertainty of the OES-CRM diagnostics [1]. In this density and temperature range electron impact de/excitation plays an important role in the population kinetics and the atomic data from the semirelativistic Breit-Pauli B-spline R-matrix calculation [2] was used. We have also performed beam emission spectroscopy for more dense and hot Ar plasma in another divertor simulating plasma device which has been constructed for generation of high heat and particle flux similar to a tokamak divertor in KAERI. In our preliminary spectral measurement, lines at 400 – 500 nm are enhanced than those at 700 – 800 nm which indicates the dominance of Ar⁺ ion. We have calculated electron-impact excitation cross section and radiative transition rates for Ar⁺ ion and obtained a simply modeled spectra by the flexible atomic code. The detailed comparison of the atomic data with other available experimental [3] and theoretical data [4, 5] will be presented and discussed.

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