Electron impact ionization cross sections of beryllium and tungsten atoms

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The ionization cross sections are essential in the modeling of plasma in fusion research. Beryllium (Be) is one of the materials which is directly exposed to the plasma components in the International Thermonuclear Experimental Reactor (ITER) [1]. Formation of gas-phase Be in various charge states and of hydrides of Be, takes place when the erosion of Be walls occurs in contact with the hot plasma containing hydrogen and its isotopes. Electron collision processes on the beryllium and its charged states play an important role in the fusion edge and diverter plasmas. The tungsten (W) and tungsten based materials have also been recommended as one of the materials to be used as plasma facing components for the International Thermonuclear Experimental Reactor (ITER) [1], and it is also been used in the number of current tokamaks such as JET, ASDEX-Upgrade and DIII-D. Electron induced processes are prevalent in such magnetic fusion devices in a wide range of energies. Total cross sections have been reported for the Be and W atoms and their charged states [2-5]. We report electron impact differential cross sections for the ionization of Be and W atoms and charged sates of Be. We also report the electron impact total cross sections for Be and W atoms and ions. The cross sections have been calculated in the distorted wave approximation using potential generated by Hartree-Fock methods [6-8].

References

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