Divertor detachment and power dissipation by Neon impurity gas seeding DEZHEN WANG, DAOYUAN LIU, CHAOFENG SANG, School of Physics, Dalian University of Technology, Dalian 116024, China, LIANG WANG, Institute of Plasma Physics, Chinese Academy of Sciences, Hefei 230031, Peoples Republic of China — Scrape-Off Layer Plasma Simulation (SOLPS) code package, has been applied to study the mechanism of neon gas seeding induced radiation power dissipation. Impurity seeding is a conventional method to achieve divertor detachment for the tokamak devices with metallic plasma facing materials (PFMs). Neon (Ne) is one of the typical seeding gases. It is known that the impurities can increase the power radiation significantly; however, the role of different charge state at different locations is still unclear. By comparing distributions of the line radiation losses and the density of different charge states of neon, it is found that the power radiation is not only decided by the impurities density, e.g. the radiation loss is dominated by Ne5+, however, Ne8+ has the highest peak density, but also decided by the impurity distributions. The main reason is that power radiation is also a function of electron temperature. In the tokamak, different locations have different Te, therefore, it can influence the power radiation rates. By doing a large level of power scan, the power radiation by Ne is evaluated, which can help to understand the impurity-induced detachment for the future reactor.

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