RECOMBINATION PROCESS FROM A METASTABLE STATE

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The level $2s2p^2(^4P)$ of OIV is a metastable state and the line intensity I_i ($2p^3(^4S) - 2s2p^2(^4P)$) is mainly generated by the excitation from the metastable state $2s2p^2(^4P)$ to $2p^3(^4S)$. Then the line intensity ratio is I_i to the resonance line intensity I_r ($2s2p^2(^2D) - 2s^22p(^2P)$) has a dependence on electron density until the metastable level is saturated. The ratio I_i/I_r obtained from the measurements of JIPPT-IIU Tokamak plasmas has been analyzed. It is found that the recombination from a metastable state of OV $2s2p(^3P)$ to the metastable state of OIV $2s2p^2(^4P)$ is appreciable in high temperature plasmas where the abundance of OV is larger than that of OIV. The recombination rate coefficient between metastable states is determined from the line intensity ratios; $I(2p^2(^3P) - 2s2p(^3P))/I(2s2p(^1P) - 2s^2(^1S))$ of OV, $I_r^{OV}(2s2p(^1P) - 2s^2(^1S))/I_r^{OIV}(2s2p^2(^2D) - 2s^22p(^2P))$ and I_i/I_r of OIV. This recombination process consists of dielectronic recombination and radiative recombination.

https://doi.org/10.1017/S0252921100085286 Published online by Cambridge University Press