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Modeling of Hydrogen Retention in Co-deposited Layers with Trap Distribution[1] R.D. SMIRNOV, S.I. KRASHENINNIKOV, M.J. BALDWIN, R.P. DOERNER, UCSD — It has become increasingly evident in recent years that plasma-wall interactions causing particle and energy exchange play crucial role in control of edge plasma and life-cycle of plasma-facing components in fusion devices. Under such conditions concurrent sputtering and re-deposition of wall material lead to formation of material layers with co-deposited hydrogen, which are largely responsible for retention of hydrogen fuel in fusion vessel. However, conventional approach to modeling of hydrogen retention with discrete traps appears insufficient to describe experimentally observed time evolution of hydrogen outgassing from co-deposits. In this work we present a model of retention with continuous spectrum of trap energies and apply it to a series of thermo-desorption experiments on beryllium co-deposits performed on PISCES device. We demonstrate that the model reproduces main features of the co-deposit outgassing experiments, including time evolution of the desorption flux in different thermal regimes. The implications of the obtained results on our understanding of the retention mechanisms are discussed.

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