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The effect of realistic surface coefficients on the electron dynamics and process control in simulations of capacitive RF plasmas MANASWI DAKSHA, BIRK BERGER, JULIAN SCHULZE, Department of Physics, West Virginia University, Institute for Electrical Engineering, Ruhr-University Bochum, ARANKA DERZSI, IHOR KOROLOV, ZOLTAN DONKO, Hungarian Academy of Sciences, SEBASTIAN WILCZEK, THOMAS MUSSENBROCK, Institute for Electrical Engineering, Ruhr-University Bochum — In most PIC simulations of capacitively coupled plasmas (CCPs), only an ion induced constant secondary electron emission coefficient, γ, is used, which is usually guessed to be 0.1. Similarly, a constant electron reflection coefficient, ρ, is typically used and assumed to be 0 - 0.2. Here, we utilize an ion and atom induced energy-dependent γ for "dirty" and "clean" surfaces in a single frequency 13.56 MHz CCP. Its effects on electron heating mode transitions are analyzed as a function of pressure. By utilizing the same energy-dependent γ, its effects on the separate control of the ion flux and mean ion energy are studied for a dual frequency (df) CCP with frequencies of 2 and 27 MHz. The results are compared to multiple simulations with constant γ and significant differences are found. Finally, ρ is varied in a single frequency CCP and its effects on plasma parameters such as the sheath width and electron density are studied. Strong effects of using different reflection probabilities at both electrodes on the discharge symmetry are found. A df CCP is modeled to understand the coupling between the electrical asymmetry effect (EAE) and a discharge asymmetry induced by different electron reflection coefficients for the two electrodes.

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