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The effects of secondary electrons on the discharge characteristics and control of particle properties in low-pressure capacitively coupled plasmas[1] ARANKA DERZSI, West Virginia University, BENEDEK HORVATH, Wigner Research Centre for Physics, KATHARINA NOESGES, SEBASTIAN WILCZEK, Ruhr-University Bochum, ZOLTAN DONKO, Wigner Research Centre for Physics, JULIAN SCHULZE, Ruhr-University Bochum — In particle-based simulation studies of low-pressure capacitively coupled plasmas (CCPs), the assumption of a constant ion induced secondary electron emission (SEE) coefficient is typical; this coefficient is independent of the incident particle energy and angle, the electrode material and its surface conditions. The emission of SEs by electron impact and by other plasma species is typically neglected in such simulations. Recent studies emphasize the importance of the realistic description of the SEE in simulations of low-pressure CCPs, as largely different results can be obtained for the same discharge conditions based on different (simple or realistic) descriptions of the various SEE processes. In this work, we perform a systematic investigation of the effects of implementing realistic energy- and material-dependent SE yields for heavy particles and electrons in PIC/MCC simulations of low-pressure CCPs on the plasma parameters and control of ion properties at the electrodes. The simulations cover discharge conditions that are relevant for plasma processing applications of surfaces.

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