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Operation characteristics of high-Voltage, low-pressure CCPs targeting etching applications[1]

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Motivated by High Aspect Ratio etching applications the operation characteristics of argon CCPs in the sub-Pa pressure range operated with a base frequency of 400 kHz and primary voltage amplitude of 10 kV is investigated by means of 1d3v PIC/MCC simulations. An optimization of electron and ion energy distributions (EEDF and IEDF) at the electrodes is performed by varying the complex voltage waveforms including multiple harmonics and pulsed shapes, as well as using sophisticated surface material models for SiO_2 and pure Si. A strong influence of the secondary electron emission properties of the electrode surfaces on the charged particle dynamics and the EEDF is found especially in the case of unequal electrode materials.

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