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The EAE in geometrically asymmetric dual frequency capacitively coupled radio frequency discharges EDMUND SCHUENGEL, Institute for Plasma and Atomic Physics, Ruhr-University Bochum, JULIAN SCHULZE, UWE CZARNETZKI — Capacitively coupled radio frequency (CCRF) discharges are widely used for surface processing applications. Geometrically asymmetric CCRF discharges typically consist of a powered electrode with surface size A_p placed in a grounded vacuum chamber with wall surface area $A_g >> A_p$. In order to compensate the flux of electrons and positive ions at each electrode within one rf period, a DC self bias η develops. High ion energies at the powered electrode surface lead to unique processing opportunities. The Electrical Asymmetry Effect (EAE) is based on the application of a fundamental frequency and its second harmonic with an adjustable phase θ to the discharge. It allows the control of η and the ion energies in a geom. symmetric discharge. Here, the DC self bias and the ion energies are measured in a geom. and electrically asymmetric discharge. The geom. asymmetry shifts the control range of η to smaller values. Depending on the particular choice of θ, the ion energy is increased at the powered electrode or at the grounded surfaces promising better chamber cleaning conditions. The results are understood by means of an analytical model. Funded by the Ruhr-University Research Department Plasma and the A. von Humboldt Foundation.

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