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Ion energy distributions at the electrodes of high pressure capacitive dual-frequency hydrogen discharges EDMUND SCHÜNGEL, SEBASTIAN MOHR, JULIAN SCHULZE, UWE CZARNETZKI, Ruhr-University Bochum — Capacitively coupled radio frequency (CCRF) discharges are widely used for surface processing applications, such as thin film solar cell manufacturing. In order to optimize the plasma surface interactions, the fluxes and energy distributions of radicals and ions at the substrate need to be controlled. In particular, the ion energy distribution function (IEDF) plays a crucial role. Previous investigations have shown that the mean ion energy can be changed in low pressure argon discharges via the Electrical Asymmetry Effect (EAE). Here, two consecutive harmonics are applied to the powered electrode. The main control parameter is the phase angle between the frequencies, which allows to adjust the symmetry of the discharge, the DC self bias, and the sheath voltages. In this work, the EAE is investigated in a parallel plate CCRF discharge operated in pure hydrogen at pressures of several hundred Pa. The axial component of the IEDF of the dominant ion species, H_3^+, is measured at the grounded electrode using a plasma process monitor. The results focus on the question how the shape of the IEDF, the mean ion energy, and the total ion flux change as a function of the phase angle. Funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (0325210B).

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