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Investigation of the electron and the ion kinetics in a capacitively coupled Ar plasma of intermediate pressure regime JIN SEOK KIM, Pusan Natl Univ, HO JUN KIM, Dong-A Univ, HAE JUNE LEE, Pusan Natl Univ — In semiconductor fabrications, capacitively coupled plasmas (CCPs) are widely used to etching and deposition processes. However, they have non-uniform plasma density and temperature distributions with a high plasma density near the edge which results in non-uniform etching or deposition profiles. In this study, we investigate the electron energy probability function (EEPF) from the center to the edge of a CCP at a pressure of Torr regime using a two-dimensional particle-in-cell simulation. In a narrow gap CCP, the EEPFs in the center of the CCP have three temperatures. However, Druyvesteyn-like EEPFs occur with lots of step-ionizations which result in high plasma density near the edge. In a long gap CCP, the shapes of EEPFs are similar to those of a short gap CCP at different locations. However, the mean energy of low-energy electrons at the edge is higher than that at the center. It is caused by a lateral electric field near the edge of CCPs. Also, the ion energy distribution functions on the wafer are analyzed with the change of electrode gap spacing.

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