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**Comparison of Particle-in-Cell and Fluid Simulations on Ion Energy Distribution Function and Mobility in intermediate Pressure Capacitively Coupled Plasmas.** YOONHO LEE, SEHUN OH, JINSEOK KIM, HAEJUNE LEE, Pusan National University — The variation of the ion energy and angle distribution functions in the capacitively coupled plasma is changing rapidly with the variation of gas pressure because of the increase of ion-neutral collisions with increasing gas pressure. In general, it has been accepted that fluid models work well in high pressure discharges where the drift-diffusion approximation is valid, while the non-local property of low pressure discharges can be analyzed correctly with a particle-in-cell (PIC) model. In this study, the mean ion velocity in the sheath is investigated for an intermediate gas pressure of a few Torr, which shows a significant discrepancy between the PIC results and the fluid results for different phases of an RF-cycle. In this regime, the discrepancy between two models is mainly caused by the ion momentum equation in the sheath regions due to the intrinsic properties of fluid equations. Especially, we found out that the mobility obtained from the PIC model and the mobility used in the fluid model are significantly different. We are suggesting an improved model in order to estimate the ion mobility reflecting the results of the PIC model. Finally, the results of the improved fluid model that utilizes this mobility are demonstrated and compared with the PIC simulation results.

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