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A three-dimensional hybrid simulation with electron-fluid and ion-particle model for micro dielectric barrier discharges[1] SEUNG BO SHIM, IN CHEOL SONG, Pusan Natl Univ. Korea, MIN SUP HUR, UNIST, Korea, HO-JUN LEE, CHUNG-HOO PARK, HAE JUNE LEE, Pusan Natl Univ. Korea — A plasma display panel (PDP) is a good example of a micro dielectric barrier discharge. A numerical simulation is good way to investigate the discharge characteristics in a PDP cell because experimental diagnostics is difficult in this small cell. In a high pressure gas discharge, a fluid model with a drift-diffusion approximation is a most practical method. However, drift-diffusion approximation is not applicable to heavy ion motions even at a high pressure in PDP operation. Especially, Xe ion motion is overestimated in the fluid code. A threedimensional hybrid simulation has been developed to combine a fluid model for electrons and a particle-in-cell model for ions. Discharge characteristics were investigated using the hybrid model such as the electric field intensity, and energy and angle distributions of the ions at the boundary. It was proved by the comparison of the infrared light emission that the hybrid model represents experimental results very well while the fluid model does not Also, the difference between the hybrid and the fluid code is more significant in a three-dimensional code than that in a two-dimensional code.

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