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On the E to H transition in a dual frequency inductively coupled plasma YOUNG-HUN HONG, JU-HO KIM, CHIN-WOOK CHUNG, Hanyang University — E-H transition powers with various gas pressures are investigated in a dual frequency inductively coupled plasma. Driving frequencies of 2 MHz and 13.56 MHz are applied to antennas, respectively. At low pressures ($\nu/\omega < 1$), the E-H transition power decreases with the pressure, and at high pressures ($\nu/\omega > 1$), the transition power increases with the pressure. Therefore, the transition power has a minimum near $\nu/\omega \sim 1$. In experiments, the E-H transition power of 2 MHz is lower than that of 13.56 MHz at low pressures (<10 mTorr). At high pressures (>50 mTorr), the transition power of 13.56 MHz is lower than that of 2 MHz. However, at the dual frequency operation, the transition occurs between the transition power of 2 MHz and 13.56 MHz. These transition powers of the dual frequency are consistent with those from a power balance model including plasma absorbed power and plasma loss power. In the dual frequency ICP, the E-H transition is more independent of the pressure than a single frequency ICP.

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