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The effects of magnetic field on the plasma parameters in a planar inductively coupled plasma etch system[1] JAE-CHUL JUNG, JAE HYUN SONG, WAN SOO KIM, KI-WOONG WHANG, Seoul National University, Daehak-dong, Kwanak-gu, Seoul, Korea, PLASMA LABORATORY TEAM — In this paper, magnetic field effects on a planar inductively coupled plasma etch system were studied, in which the magnetic field was applied by the use of the permanent magnets in order to obtain a uniform, high density plasma with a large diameter ($\geq$150mm) at low gas pressure ($\leq$10mTorr). Plasma parameters were measured by the double Langmuir probe and the power transfer efficiency by the impedance analyzer. Coupling mode conversion from the C- to L- mode was observed to result in big changes in the plasma density. When the magnetic field is applied, the density at the center linearly increased with the input power, and then a sharp increase in plasma density could be observed at a certain input power level which connects to a plasma density hysteresis loop. The plasma density increase with the decrease of RF power once the density jump occurred. Electron temperatures at the outer region became low after the mode transition, but the peak density increase by about 4 times. When the magnetic field configuration is optimized, the uniformity of density and temperature improved with the application of magnetic field.

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