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Plasma Characteristics for Curved Capacitive Source using Plasma Modeling KALLOL BERA, JOHN FORSTER, MANI SUBRAMANI, UMESH KELKAR, Applied Materials, Inc. — Capacitively coupled plasma (CCP) in curved configuration has been investigated for plasma density and power deposition distribution using plasma modeling. In the CCP model, charged particle densities are determined by solving transport equations using drift-diffusion approximation. The electron temperature is solved using electron energy equation. The electric (scalar) potential is derived from Poisson equation. A semi-circular annular configuration consisting of inner curved surface as powered electrode and outer curved surface as grounded electrode is used. Ar plasma at moderate pressure (a few Torr) has been simulated at 13.56 MHz. A negative dc bias develops at the powered electrode that is smaller than grounded electrode. Stronger electric field leads to stronger power deposition and correspondingly higher plasma density near the powered electrode. As straight segments are added to the semi-circular configuration, it is found that plasma drifts away from the curved region to the straight region. Further addition of semi-circular and straight segments reduces DC bias to zero as the powered electrode and grounded electrode areas become equal. However, plasma is observed to be stronger near the straight region compared to curved region as plasma drifts away from the curved region to straight region.

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