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2D Axisymmetric Simulation of an Inductively/Capacitively Coupled Plasma Reactor[1] EMI KAWAMURA, MICHAEL A. LIEBERMAN, DAVID B. GRAVES, University of California, Berkeley, CA 94720 — We use the commercial finite elements simulation package COMSOL to simulate a 2D axisymmetric TCP reactor. The simulation consists of four basic parts: an EM model, a Plasma Fluid Model, a Sheath Model, and a Gas Flow Model. For a pure argon plasma, the simulations were completed in less than an hour on a typical desktop machine with a 2GHz CPU and 4GB of memory. The EM model includes both inductive and capacitive coupling of the rf energy from the source coils to the target plasma via a dielectric window. The Plasma Fluid Model solves the time-dependent plasma fluid equations for the ion continuity and electron energy balance. The Sheath Model models an actual vacuum sheath of variable thickness with a fixed-width sheath of variable dielectric constant. The Gas Flow model solves for the steady state pressure, temperature and velocity of the neutrals. By varying the model parameters (e.g., pressure, input power, source coil configuration, chamber height), we observe the effect on the plasma (e.g., uniformity, density, capacitive coupling).

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