Abstract Submitted
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Control of Electron Energy Distribution Functions Using a Tandem Source Reactor[1] SHYAM SRIDHAR, LEI LIU, WEIYE ZHU, HYUNGJOO SHIN, VINCENT DONNELLY, DEMETRE ECONOMOU, Department of Chemical and Biomolecular Engineering, University of Houston — The electron energy distribution function (EEDF) governs most of the reactions in plasma processing, as well as determining the intensity and wavelengths of light produced by the plasma. Therefore, measuring and controlling EEDF is essential to understand and develop advanced plasma processing technologies, and suppress damaging vacuum ultraviolet production. With the goal of gaining some added control of the EEDF, we have begun studies of a tandem source plasma reactor consisting of a helical resonator (HR) operating in conjunction with an inductively coupled plasma (ICP) main source. Operating the reactor in this configuration enables us to inject plasma from the dense upstream HR through a metal grid to the downstream ICP. Preliminary studies were conducted using this setup and the effect of upstream plasma on downstream plasma was measured using a Langmuir probe. EEDFs were obtained as a function of gas pressure, bias applied to the boundary electrode, and different grid opening sizes. For grids with openings larger than the sheath thickness, the coupling between the plasmas was found to be strong, compared to grids with openings comparable to the sheath width. In the latter case, the coupling was found to be weaker and population of low energy electrons decreased due to the injection of upstream plasma.

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