

Abstract Submitted  
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**Higher harmonic waves and a center-peaked plasma density profile in VHF-CCP reactors** IKUO SAWADA, Tokyo Electron US Holdings Inc., BARTON LANE, PETER VENTZEK, Tokyo Electron America, ROCHAN UPADHAY, Esgee Technologies Inc., LAXMINARAYAN RAJA, University of Texas at Austin — Measurements of electron density profile and higher harmonic waves were performed in a very high frequency parallel-plate capacitively coupled plasma test-bench reactor. An Argon plasma was generated with a single frequency feed from the upper electrode at pressures of 20 to 100mTorr. The driving frequencies were 60 or 100MHz with electron densities ranging from  $2 \times 10^{16}$  to  $2 \times 10^{17}$  [1/m<sup>3</sup>]. With increasing power, a center peak in the density profile becomes prominent. At higher densities, over  $5 \times 10^{16}$  [1/m<sup>3</sup>], a very sharp and localized center-peaked density profile is observed. On the contrary, a broad center peak is observed at lower densities. In order to elucidate the mechanism leading to center-peaked profiles, both experimental measurement and numerical calculation of higher harmonic spectrum were performed. A relationship between higher harmonics waves over 400 MHz and a very sharp center-peaked density profile was found and is described.

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