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Electron Heating Mode Transitions in Nitrogen (13.56 and 40.68) MHz RF-CCPs UMMUGUL EROZBEK GUNGOR, SINAN KADRI BILIKMEN, Middle East Technical University, DEMIRAL AKBAR, Hacettepe University — Capacitively coupled radio frequency plasmas (RF-CCPs) are commonly used in plasma material processing. Parametrical structure of the plasma determines the demands of processing applications. For example; high density plasmas in gamma mode are mostly preferred for etching applications while stabile plasmas in gamma mode are usually used in sputtering applications. For this reason, characterization of the plasma is very essential before surface modification of the materials. In this work, analysis of electron heating mode transition in high frequency (40.68 MHz) RF-CCP was deeply investigated. The plasma was generated in a home-made (500 x 400 mm^2) stainless steel cylindrical reactor in which two identical (200 mm in diameter) electrodes were placed with 40 mm interval. In addition, L-type automatic matching network system was connected to the 40.68 MHz RF generator to get high accuracy. Moreover, the pure (99.995 %) nitrogen was used as an activation gas on account of having an appreciable impression in plasma processing applications. Furthermore, diagnostic measurements of the plasma were done by using the Impedans Langmuir single and double probe systems. It was found that two transition points; α-γ (pressure dependent) and γ-α (RF power dependent) were observed in both medium and high RF-CCPs. As a result, the α-γ pressure transition increased, whereas the γ-α power transition remained constant by changing the RF frequency sources.

Ummugul Erozbek Gungor
Middle East Technical University

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