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Investigation on Multiple Plasma Modes in Medium Pressure NF3/He Plasma SOONWOOK JUNG, SOONAM PARK, TAE CHO, KEN SCHATZ, Applied Materials — A plasma mode change in He/NF3 plasma in the medium pressure range ($\leq$ 10 Torr) has been investigated both theoretically and experimentally. Pressure often plays an important role in achieving certain process requirements. However, by changing NF3 or RF power in the medium pressure range, we found discontinuous changes in plasma. The mode changes are very similar to well - known α - γ transition, based on I-V characteristics and OES diagnostic results. In order to theoretically understand this phenomena in He/NF3 mixture, We used a simple RF breakdown formula with a modification in α and η to address the effect of NF3 electron-attachment loss. The theoretical prediction reasonably agrees with the experiments. In sum, this study indicates that the mode transition is related with the modified α to γ transition, and suggests that the onset of the mode change can be controlled with external parameters.

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