

Abstract Submitted
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A Study of Current and Voltage Relationships in a PECVD Process Plasma DOUGLAS KEIL, EDWARD AUGUSTYNIK, YUKINORI SAKIYAMA, Lam Research Corporation, LAM RESEARCH PECVD TEAM — Commercial PECVD reactors present several challenges to problem of plasma diagnosis. Among them is the scarcity of available plasma metrology which can provide genuine insight and still satisfy commercial constraints. The VI probe is one of the few instruments that can meet both of these needs. This work presents a study of voltage, current, impedance, phase and harmonic trends acquired by off-the-shelf VI probes. Voltage vs Current plots in 1 to 2 Torr CCP plasmas at moderate (< 3 kW) RF power levels are discussed for process relevant gasses. Non-linear features in these plots have been observed and their possible relation to Alpha-Gamma mode transitions, on-set of plasma instabilities and on wafer process results are discussed. Following S.J. You, et.al. the use of these data to identify the primary RF power absorption mechanism is discussed. Additionally, study of harmonics can be related to plasma asymmetry, the onset of parasitic plasma and system faults. Results from both pulsed and continuous plasmas are also discussed.

[1] S.J. You, et.al. Journal of Applied Physics V94 N12 (2003)

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