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The significance of RF power delivery for thin-film semiconductor plasma processes and the enhancements of innovative solutions DAVID J. COUMOU, MKS Instruments, Inc. — Many critical technologies rely on plasma-based material processing. Plasma processing is one of the cornerstone technologies for the semiconductor industry for its significant role in material surface interactions, thereby broadly impacting other market sectors such as display technologies, energy efficient building supplies, flexible electronics, bio-compatible materials and devices, and low cost photovoltaics. From film growth to patterning structures in high-volume manufacturing environments, a key subsystem enabling this breadth of capability is the RF power delivery systems. In this talk, we explore advances in RF power delivery systems with corresponding enablement of plasma processes ameliorating many advanced manufacturing processes. We start with basic fundamental plasma physics and the interaction of RF coupling to plasma densities. These influences are then leveraged to improve uniformity and sheath voltage tailoring for ion energy control. We exploit this capability for both inductive and capacitively coupled plasma reactors used in semiconductor manufacturing. We include the advent of evolving technologies for the enhancement of distortion cancellation prevalent in multi-frequency reactors and RF power delivery factors to improve chamber matching.

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