

Abstract Submitted
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Effects of rf phase control in VHF-CCP system YEONGHUN HAN, CHUL-HO SHIN, SANG-MIN JEONG, DOUGYONG SUNG, Samsung Electronics Co., SEMICONDUCTOR R&D CENTER TEAM, PROCESS EQUIPMENT DEVELOPMENT TEAM TEAM — On plasma parameters and characteristics in a plasma process, we studied in the influence of the phase control between top electrode and bottom electrode that was applied by rf power in a very high-frequency (VHF) Capacitively Coupled Plasma (CCP) triode system. The rf voltages at 100 MHz were individually applied to the top and bottom electrodes. The phase shift of each rf powers could be controlled between 0° and 360° by phase shifter. The electric field from top electrode to bottom electrode was minimum as phase shift 0° and maximum as phase shift 180° . As changing phase shift, it made differences of electron density, electron temperature, plasma potential, chemical dissociation and plasma uniformity concerning OES intensity in 12 inch wafer. In spite of the same rf power condition, the phase controlled CCP was more useful from the plasma process point of view. We could verify that the phase-shift effect can control ion density, electron temperature and plasma potential in VHF-CCP system and that the phase-shift method could be a new knob to control plasma characters in large area plasma system.

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