

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Role of Radio Frequency Power in the Plasma Enhanced Chemical Vapor Deposition SUDIP SEN, Claflin University, SC and College of William & Mary, VA — PECVD, Plasma Enhanced Chemical Vapor Deposition, is used to deposit thin films from a gas state to a solid state on a substrate. Experimental study from the X-ray diffraction spectra of Silicon-Oxide films deposited as a function of radio frequency (rf) power apparently indicates that RF power might be playing a stabilizing role and produces better deposition. The results show that the rf power results in smoother morphology, improved crystallinity, and lower sheet resistance value in the PECVD process. The PECVD processing allows deposition at lower temperatures, which is often critical in the manufacture of semiconductors. In this invited talk we will address two aspects of the problem, first to develop a model to study the mechanism of how the PECVD is effected by the RF power, and second to actually simulate the effect of rf power on PECVD. As the PECVD is a very important component of the plasma processing technology with many applications in the semiconductor technology and surface physics, the research proposed here has the prospect to revolutionize the plasma processing technology through the stabilizing role of the rf power. Recent results obtained after the abstract submission will also be included.

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Date submitted: 24 Sep 2014

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