Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Improvement of thin films by plasma assisted deposition EDMUND SCHUENGEL, SILVIO GEES, SILVIA SCHWYN-THOENY, Evatec AG, 9477 Truebbach, Switzerland — The quality of thin films deposited in sputter processes is improved by using an additional plasma treatment. Here, the role of an additional capacitively coupled radio frequency plasma with a single grid confinement is investigated. We focus on the scenario of the sputter plasma and the plasma source being active at the same time in the same vacuum environment, with a substrate repeatedly being exposed to either one of them. Depending on the conditions, the additional treatment by the plasma source may affect the deposition process physically by generating energetic ions, which bombard the surface, and chemically by generating reactive species such as atomic oxygen. A significant interaction between the dc or dcrf sputter plasma, where the reactive gas flow is actively controlled, and the auxiliary rf plasma is observed. These effects are examined by voltage and ion energy measurements as well as by optical emission spectroscopy. Furthermore, the benefits in film structure, surface roughness, and optical properties due to physical and chemical mechanisms in plasma assisted processes are highlighted.

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Date submitted: 02 Jun 2017 Electronic form version 1.4