Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Multiple frequency capacitive plasmas for PVD: Influence of external process parameters on ferromagnetic film properties STEFAN BIENHOLZ, EGMONT SEMMLER, PETER AWAKOWICZ, Ruhr University Bochum, Institute for Plasma Technology, HAYO BRUNKEN, ALFRED LUDWIG, Ruhr University Bochum, Institute for Materials — Over several years capacitively coupled plasmas have been of great importance in PVD coating processes. Sputtering ferromagnetic targets, typical magnetron coaters need rather complex magnetic configuration to sustain a reasonable deposition rate. To overcome such problems, we propose a multiple frequency driven capacitively coupled plasma (MFCCP). Whereas plasma excitation in the VHF and HF band cause a high ion flux with large bombarding energies on the target electrode, an additional substrate bias is used to control the ion energy directly on the substrate surface to influence the morphology and crystallinity. In this contribution we discuss the result from different coating experiments using pure iron (Fe) and nickel (Ni) targets. General film properties such as thickness, morphology, and crystalline composition are investigated as well as magnetic properties. The experiments document an suitable control of film properties and show that MFCCPs are a promising complement to existing ferromagnetic sputter processes.

Stefan Bienholz
Ruhr University Bochum

Date submitted: 11 Jun 2010 Electronic form version 1.4