In recent years, magnetic spin valves (SVs) have been widely studied in terms of their potential application in high-density magnetic recording and high sensitivity magnetic sensing because of their low field magnetoresistance behavior. It is well known that underlayer and seed layer play significant role in the nanostructure properties of SVs like the preferential crystallite orientation (texture) [1] or to prevent interdiffusion with the substrate [2, 3]. Depending on the SV type (bottom or top) and materials of antiferromagnetic layer as IrMn [4, 5], PtMn [6], FeMn [7] different underlayers were used. Recently, same underlayer and seed layer systems have been investigated for IrMn based Top-SV systems using DC magnetron sputtering deposition (DC-MSD) at different thicknesses. Only in few studies, the IrMn based bottom-SVs were investigated. Kim et al. used Ta(5 nm)/NiFe(2 nm) for IrMn(7.5 nm)/CoFe(3 nm)/Cu(2.5 nm)/CoFe(3 nm)/Ta(5 nm) [4] and Han et al. Ta(3 nm)/NiFe(2 nm) for IrMn(6 nm)/CoFe(3 nm)/Cu(2 nm)/CoFe(3 nm)/Ta(3 nm) [8] SV structure. In both studies DC-MSD technique was used. In this study, the effects of Ta underlayer, NiFe seed layer and their thickness on the microstructure properties of IrMn based bottom spin valves without spacer and free layer have been investigated. The Pulsed-DC magnetron sputtering technique (DC-MS) has become one of the most useful technologies to prepare AMR and PHE permlalloy films for its high speed and stability [1-11].

In the present study, the correlation between electrical resistivity and nanostructure of Ta/NiFe sub 10 nm films deposited by Pulsed-DC magnetron sputtering have been investigated. Resistivity decreasing was determined, after fixed Ta and increasing NiFe thickness. The results were also comparison and discussed with films deposited by DC-MS technique.

| Keywords: multiayer thin films; X-ray reflectometry; X-ray rocking curve |

**FA2-MS06-P04**

**Thickness Optimization of Underlayer and Seed Layer for Spin Valves. Hakan Cinar**$^a$, Mustafa Oksuzoglu$^b$, Mustafa Yildirim$^c$, Erdal Öksüzoğlu$^c$. $^a$Department of Advanced Technologies, Graduate School of Science, Anadolu University, Eskisehir, Turkey. $^b$Department of Material Science and Engineering, Anadolu University, Eskisehir, Turkey. $^c$Department of Physics, Graduate School of Science, Anadolu University, Eskisehir, Turkey.

E-mail: hakancinar@anadolu.edu.tr

| Keywords: multiayer thin films; X-ray reflectometry; X-ray rocking curves |

**FA2-MS06-P05**

**Influence of Deposition Technique on Growth and Resistivity of Ta/NiFe Nano Films. Ogeday Capar**$^a$, Mustafa Yildirim$^b$, Hakan Cinar$^a$, Ramis Mustafa Oksuzoglu$^c$. Department of Materials Sciences and Engineering, Anadolu University, Eskisehir, Turkey.

E-mail: ocapar@anadolu.edu.tr

Recently, soft magnetic NiFe permalloy thin films indicating Anisotropic Magnetoresistance (AMR) and Planar Hall Effect (PHE) [1,2] have attracted considerable attention due to their potential application in antiferromagnetic/ferromagnetic exchange bias in read sensors [3,4], magnetic and biosensors [5,6], and magnetic recording media [7]. DC magnetron sputtering technique (DC-MS) has become one of the most useful technologies to prepare AMR and PHE permalloy films for its high speed and stability [1-11].

In the present study, the correlation between electrical resistivity and nanostructure of Ta/NiFe sub 10 nm films deposited by Pulsed-DC magnetron sputtering have been investigated. Resistivity decreasing was determined, after fixed Ta and increasing NiFe thickness. The results were also comparison and discussed with films deposited by DC-MS technique.

| Keywords: X-ray reflectivity; X-ray diffraction; resistivity |

**FA2-MS06-P06**

**DFT Modelling of Defects in Strontium Titanate. Matthias Zschornak**$^{ab}$, Emanuel Gutmann$^a$, Hartmut Stöcker$^c$, Irina Shakhverdova$^d$, Torsten Weißbach$^b$, Tilmann Leisegang$^b$, Dirk C. Meyer$^a$, Sibylle Gemming$^a$. $^a$Institute of Ion Beam Physics and

---

25$^{st}$ European Crystallographic Meeting, ECM 25, Istanbul, 2009