9.7 cm

# Pseudo spin-valve structures with Co/Ti as soft magnetic layer

**M. Schmidt**[a,b], **F. Stobiecki**[a], **B. Szymański**[a]

[a]Institute of Molecular Physics Polish Academy of Science, ul. Smoluchowskiego 17, 60-179 Poznań, Poland

[b]ISIS Facility, Rutherford Appleton Laboratory, Chilton Oxon. OX11 0QX, United Kingdom

Magnetic multilayer structures exhibiting the magnetoresistance (MR) effect are of particular interest due to their potential application as magnetic field sensors or reading heads in magnetic storage devices. To improve the sensitivity ($S = \Delta R/R\Delta H$) of these structures a particular attention has been paid to systems containing soft magnetic materials such as NiFe, NiFeCo, FeCoB or ultra-soft amorphous Co-Zr alloy. We investigated a series of pseudo spin-valve (PSV) structures containing Co/Ti layered structure as an ultra-soft layer. The PSV structures (Ti2Å/ Co8Å)$_2$/Co25Å/Cu-$d_{Cu}$/Co20Åwere deposited onto Si(100) substrate using sputtering technique. Copper thickness was varied in the range (8Å$\leq d_{Cu} \leq$38Å). The MR effect was studied using 4-point d.c. technique and hysteresis curves were measured using VSM in fields up to 200 Oe. We observe the MR effect in samples with $d_{Cu} > 24$Å. These samples exhibit magnetoresistance loops characteristic for PSV structures with the MR value reaching 5% with sensitivity of 2%/Oe. The MR, as a function of Cu thickness, slowly decreases with increasing copper thickness and exhibits two maxima around 26Å and 34Å of Cu. We also briefly report the use of the Co/Ti layered structure in spin-valves exhibiting tunneling magnetoresistance effect (TMR) with $Al_2O_3$ as the insulating barrier. This work presents a novel use of the Co/Ti layered structure as the soft layer in PSV structure.

13.4 cm

**Subject category :**

2. Magnetic Films, Surfaces and Multilayers

**Presentation mode :**
poster

**Corresponding author :**
M. Schmidt

**Address for correspondence :**
ISIS Facility, Rutherford Appleton Laboratory, Chilton Oxon. OX11 0QX, United Kingdom

**Email address :**
Marek.Schmidt@rl.ac.uk