

PLANAR HALL EFFECT MEASUREMENT AS THE BIOSENSOR WITH DYNABEADS[®] M-280

N.T.Thanh^{1,2}, M.G. Chun², G.W. Kim¹, K. E. Lee¹, K.Y. Kim², C.O. Kim¹, C.G. Kim¹

¹*Department of Material Science and Engineering, Chungnam National University, 220 Gung-dong, Yuseong-gu, 305-764, Daejeon, Korea,*

²*Korea Institute of Science and Technology, Cheongryang, Seoul, 130-650, Korea*

Abstract

The Planar Hall Effect in spin-valve structure of Ta/NiFe/CoFe/Cu/CoFe/IrMn/Ta has been applied to measure as the biosensor with Dynabeads[®] M-280. The spin-valve structure was fabricated by DC Magnetron Sputtering System with the base pressure of about 10^{-9} Torr. The patterns were prepared with the size of $50 \times 100 \mu\text{m}^2$ by lithography method and the experiments were carried out on biosensor measurement system where the output observations were on nanovoltmeter. During getting the signals, a pipet-lite was also used to drop and clean the beads on top of pattern. The signals of sensors investigated at different external magnetic fields from 3 to 12 Oe performed that the results induced from detection were clearly (fig.1) and vary as the external magnetic fields vary. Worthily, a bead resolution of about 200 has achieved at 7 Oe for magnetic dilution. Furthermore with including sensitivity of about $16 \mu\text{V}/\text{Oe}$, this sensor can be applied in biochips for protein and DNA screening.

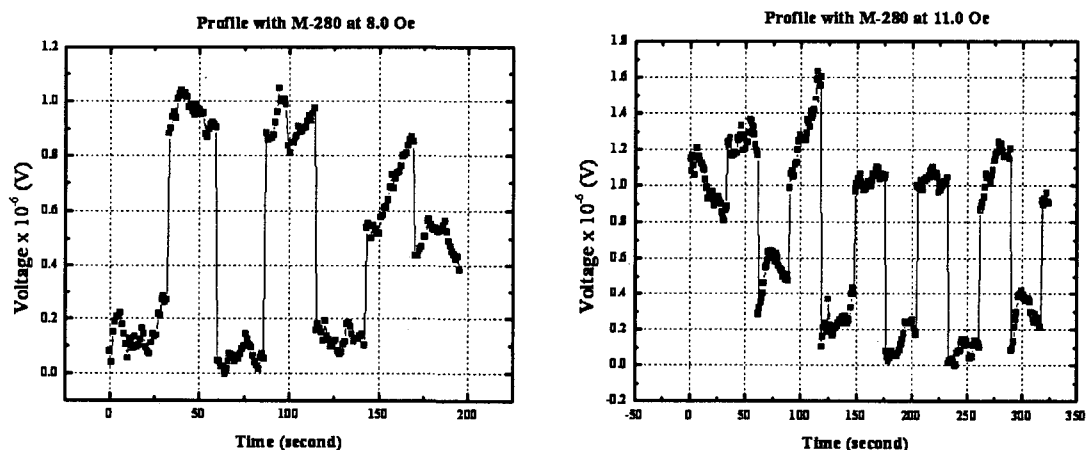


Fig.1 The real-time sensing data showing voltage changes with fixed current of 1 mA at external field of 8 and 11 Oe. The high state is with magnetic bead and low is the state of washed beads