Moreau, P., Hulea, V., Gomez, S., Brunel, D. & Di Renzo, P. (1997). Oxidation of Sulfoxides to Sulfones by Hydrogen Peroxide over Ti-containing Zeolites. *Applied Catalysis A: General*, 155: 253-263.

Serrano, D. P., Uguina, M.A., Ovejero, G., Van Grieken, R. & Camacho, M. (1995). Synthesis of TS-1 by Wetness Impregnation of Amorphous SiO_2-TiO_2 Solids Prepared by the Sol-Gel Method. *Microporous Materials*, 4 : 273-282.

Roisnel, T & Rodriguez-Carvajal, J. (2001). *WinPlotr Program*. France : LLB-LCSIM Rennes.

Taramasso, M., Perego, G. & Notari, B. (1983). *U.S. Pat.* 4 410 501.

Taramasso, M. & Neri, C. (1983). *U.S. Pat.* 4 396 783.

Tatsumi, T., Nakamura, M., Negishi, S. & Tominaga, H. (1990). Shape-selective Oxidation of Alkenes with H2O2 Catalysed by Titanosilicate. *Journal of Chemical Society, Chemical Communication*, 476-477.

Thangaraj, A., Eapen, M.J., Sivasanker, S. & Ratnasamy, P. (1991). Studies on the Synthesis of Titanium Silicate (TS-1). *Zeolites*, 12 : 943-950.

Wang, X. & Guo, X. (1999). Synthesis, Characterization and Catalytic Properties of Low Cost Titanium Silicate. *Catalysis Today*, 51: 177-186.

ANALISIS GMR Ag-Fe PADA PEMBUATAN BAHAN SENSOR MEDAN MAGNET DENGAN METODA IMPLANTASI ION

Oleh:
Edi Istiyono
Staf Pengajar FMIPA UNY

Abstract

The national instrumental industries need support materials that have good electrical and magnetic properties. One is for sensor to measure magnetic field, i.e.: magnetic layer. The experiment is to find material for magnetic layer that has high GMR ratio required for sensor. The sample is an Ag-Fe thin film produced by ion implantation: silver implanted with iron ions at various doses from 1.5 x 10^{17} ions/cm^2 to 9.0 x 10^{17} ions/cm^2 and energy from 40 keV to 100 keV. GMR is determined by four-point probe method in magnetic field. Based on data analysis is conclused that: (1) Increasing of iron ions in Ag-Fe that produced by ion implantation causes decreasing of resistivity. Initially, increasing of annealing temperature causes decreasing of resistivity to minimum point, then the resistivity increases by increasing of annealing temperature; (2) Influence of ions dose, energy and annealing temperature to GMR: (a) Initially, increasing of iron ions increases GMR ratio to the maximum point, then the GMR ratio decreases, (b) Increasing of the ion energy that is used the GMR ratio produced decreases and (c) Increasing of annealing temperature can rise GMR ratio; (3) Ag-Fe for ion dose of 6.0 x 10^{17} ions/cm^2, energy of 100 keV, and annealing temperature at 300 ℃ has a minimum resistivity of (16.7 ± 3) x 10^{-9} Ωm and optimum of GMR ratio of 6.49%. Ag-Fe in the condition is a good material for magnetic field sensor; and (4) the curves of magnetoresistance are simetry and maximum resistance about magnetic field equal to zero.

Keywords: sensor, ion implantation, ion dose, and GMR

PENDAHULUAN

Seiring dengan perkembangan ilmu pengetahuan dan teknologi (IPTEK), bidang elektronika mengalami perkembangan