

Noppakao Srakaew 2013: Structure and Magnetic Properties of Fe-Ni Alloy Prepared by Sol-Gel and Reduction Method. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Assistant Professor Pongsakorn Juntaratana, Ph.D. 70 pages.

In this thesis, the physical and magnetic properties of Fe-Ni alloy prepared by two steps process, sol-gel and reduction process was studied as a function of heat treatment temperature (400 - 800 °C). The Differential Scanning Calorimeter (DSC) analysis showed that the Fe-Ni alloy phase formation was started at 400 °C and the result was also confirmed by X-ray diffraction pattern. Grain size of the sample increased with increasing temperature of reduction process from 400 to 800 °C. The molar ratio of Fe to Ni was rather constant at 1:3 with increasing temperature from 400 to 700 °C and rapidly increased to about 1:1 at 800 °C. The increase of heat treatment temperature in reduction process led to magnetic softening of the Fe-Ni alloy. With increasing heat treatment temperature from 400 to 700 °C, the coercivity and remanence magnetization decreased but the saturation magnetization increased. The maximum saturation magnetization of 129 emu/g was observed at the treatment temperature of 700 °C. Magnetic properties of the prepared samples were strongly dependent on the grain size and molar ratio of Fe to Ni.

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