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Magnetic Studies on Hybrid Bonded Magnets of NdFeB and Sr-ferrite Using Mixture Design

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Bonded magnets are composite of magnetic powders and binder materials. The commercially important bonded magnets are primarily based upon hardferrite and rare earth permanent magnets (REPM). As compared to hard ferrite, REPM exhibit superior magnetic properties, but per unit available magnetic energy price is high. Among the class of permanent magnetshard ferrite magnets are the cheapest one. To achieve cost and properties between hard ferrite and REPM, one of the better approaches is to mix them in adequate proportion with suitable binder and mould it in desired shape as per the requirement and application. This may be considered as a new class of hybrid-bonded magnets. Few studies on the hybrid-bonded magnets of strontium ferrite ($SrFe_{12}O_{19}$) with $Nd_2Fe_{14}B$ are reported [1-2]. However, none of them is based on designing their magnetic properties with statistical design approach. The present paper deals with the study of hybrid polymer bonded magnets of strontium ferrite and Neodymium Iron Boron (NdFeB) powders. All the bonded magnets were prepared by compression moulding using epoxy resin. To understand the effect of NdFeB, Strontium ferrite and binder percentage on the magnetic properties a three component constraint mixture design employing ten runs for the experiment was used. The results are modelled in the form of mathematical equation to predict the response, so that the empirical prediction of the response to any mixture over the entire compositions. A three-component constrained mixture design was used to accomplish the study. The magnetic properties such as remanence (B_r), coercivity (H_c) and energy product $(B.H)_{max}$ were used as the response. The predicted results from the obtained mathematical equation are compared with the experimentally measured values and found to be in agreement with the measured one.

REFERENCES

[1] Daniel Rodrigues, Fernando Jose, Gomes Land Graf, Marflia Emura, proceedings of 15th international workshop on rare earth magnets, held at Dresden, Germany, 437 (1998).
[2] E. Mura, A.C. Neiva, F.P. Missel, j. app phys, **83**, 7127 (1998).

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FeRh-FePt exchange spring media for Heat Assisted Magnetic Recording

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A coercivity reduction upon heating using FeRh-FePt exchange coupled media is presented in this paper. FeRh film has a unique property whereby upon heating above a certain critical temperature, it will undergoes isotropic lattice expansion and change from anti-ferromagnetic to ferromagnetic with high magnetic moment with low magnetic anisotropy. By fabricating FeRh-FePt composite layer, at room temperature the FeRh anti ferromagnetic phase helps the long term stability of the FePt layer. While at ferromagnetic phase, it forms an exchange-spring system which significantly reduces the writing field requirement as compared to single FePt layer. The transition temperature of the FeRh layer could be further modified by adding elements such as Ir or Pd. Such a FeRh-FePt exchange-spring system significantly reduces the temperature requirement for the writing process, thus making it an excellent candidate as the magnetic media for Heat Assisted Magnetic Recording.

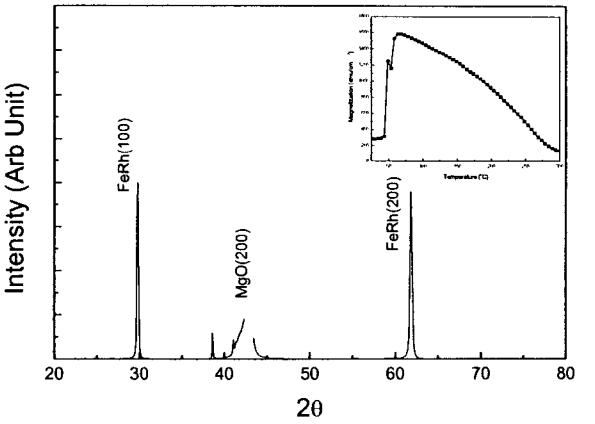

Fig. 1. XRD 2θ scan of $Fe_{0.55}Rh_{0.45}$ deposited on MgO at 450°C. The inset shows the magnetization vs temperature of the $Fe_{0.55}Rh_{0.45}$ which showed an onset of transition temperature around 50°C