

**HEUSLER-LIKE SHORT RANGE ORDER
in $(\text{CoFe})_{1-x}\text{Ge}_x$: ^{59}Co NMR STUDY**

M. Wójcik^a, E. Jędryka^a, S. Matt^b, M.J. Carey^b, and J.R. Childress^b

^aInstitute of Physics, PAS, Al. Lotnikow 32/46, 02-668 Warszawa, Poland

^b San Jose Research Center, Hitachi Global Storage Technologies, 3403 Yerba Buena
Road, San Jose, California 95135, USA

Ferromagnetic alloys which show an enhanced CPP (current perpendicular to plane) magnetoresistance effect (MR) are of great current interest for application in future high density recording read heads sensors. It has recently been shown that spin valves based on $(\text{CoFe})_{1-x}\text{Ge}_x$ alloys in the composition range around $x = 0.25$ and annealed at 245 °C exhibit MR effect enhanced relative to that observed for CoFe alloy. In order to clarify the effect of the addition of Ge to the CoFe alloy, the short range order has been studied by ^{59}Co NMR in a series of $(\text{CoFe})_{1-x}\text{Ge}_x$ thin films ($0 \leq x \leq 0.4$) before and after annealing at 245 °C. It has been found that up to $x = 0.1$ the samples reveal the features of a disordered *bcc* alloy with Co, Fe and Ge atoms randomly distributed on *bcc* lattice and that annealing has only a minor effect on the atomic arrangement. On the other hand, for $0.2 \leq x \leq 0.3$ the alloys reveal a strong preference for a short range order favoring the Co local environment with 4 Ge atoms among 8 nearest neighbors on *bcc* lattice. This type of local environment is characteristic for highly ordered Co_2FeGe Heusler compound with L2_1 structure, which is known to secure a high degree of the conduction electron spin polarization and thus it can be expected to be a major source of the MR enhancement observed in CoFeGe alloys.

9.7 cm

13.4 cm

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Corresponding author :

M. Wójcik

Address for correspondence :

Institute of Physics, Polish Academy of Sciences
Al. Lotnikow 32/46, 02-668 Warszawa
Poland

Email address :

wojci@ifpan.edu.pl