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⁵⁹Co Internal field NMR analysis of Co₃₅Fe₃₅Ni₃₀ alloy synthesized via novel low cost chemical reduction technique

G. Srinivasa Reddy¹, M.Manjunatha², K.P.Ramesh²

1. Department of Physics, Presidency University, Bangalore, 560064, India

2. Department of Physics, Indian Institute of Science, Bangalore, 560054, India

Abstract

We have synthesized ternary cobalt alloy using a chemical reduction process using hydrazine as a reducing agent. X-Ray Diffraction (XRD) measurements shows that the synthesized cobalt ternary alloy exists in the pure face centred cubic (*fcc*) phase with lattice parameter of $3.5562 \pm 5 \text{ \AA}$. The SEM micrograph shows that the particles exist in the spherical shape which suggests that the particles are crystallized in *fcc* phase. The magnetic properties are determined using Vibrating Sample Magnetometry (VSM) and ⁵⁹Co IFNMR technique. The saturation magnetization (*M_s*) of the synthesized sample is ~80 emu/g, a slightly lower value compared to the pure cobalt metal. ⁵⁹Co IFNMR technique shows that there is a broad distribution of hyperfine field (~6 T) compared to the pure *fcc* cobalt metal. Further, from the deconvoluted NMR peaks suggests that the variation in the nearest neighbours to the central cobalt atom leads to the different hyperfine field.

Keywords:

Ternary alloy, ⁵⁹Co IFNMR, *fcc*, VSM, XRD, Co₃₅Fe₃₅Ni₃₀

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