

SUPPLEMENTARY INFORMATION

Observation of short range ferromagnetic interactions and magnetocaloric effect in cobalt substituted $\text{Gd}_5\text{Si}_2\text{Ge}_2$

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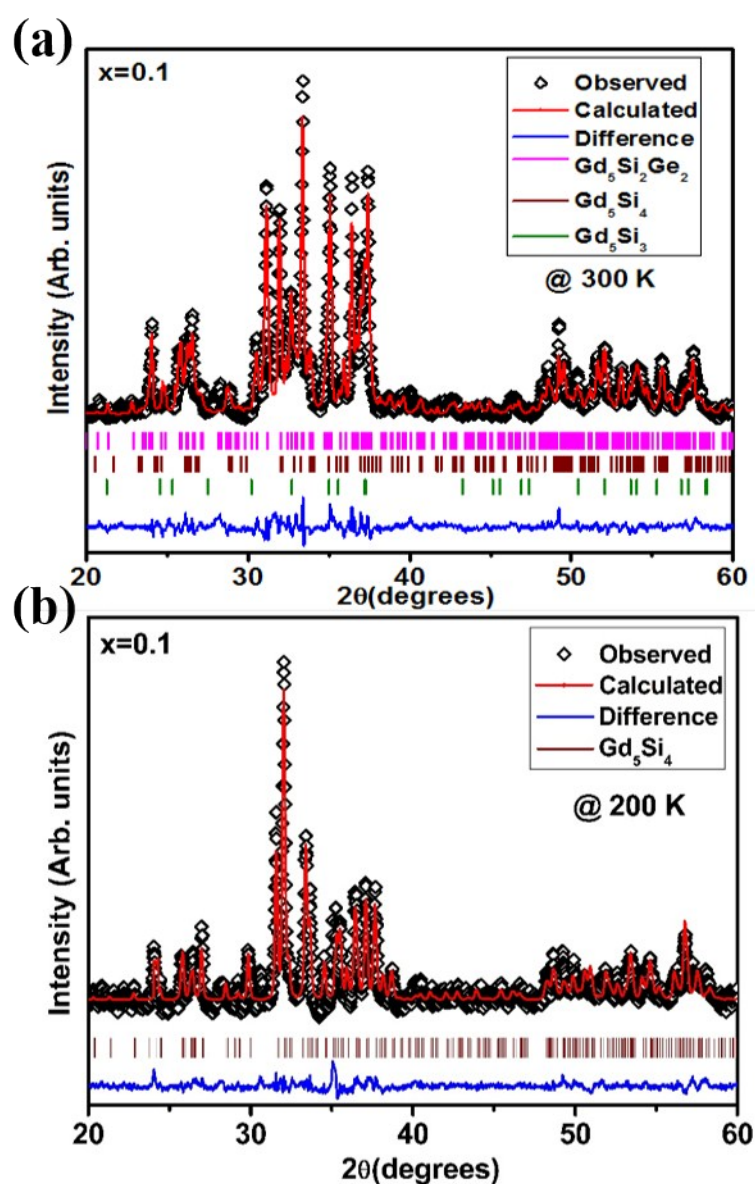


FIG. S1. Temperature dependent XRD of $\text{Gd}_5\text{Si}_{2-x}\text{Co}_x\text{Ge}_2$ with $x=0.1$ at (a) 300 K and (b) 200 K

Table S1. Lattice parameters and reliability factors from the Rietveld refinement of $\text{Gd}_5\text{Si}_{1.9}\text{Co}_{0.1}\text{Ge}_2$ at 300 K and 200 K

Gd ₅ Si _{1.9} Co _{0.1} Ge ₂		300 K			200 K
Crystal Structure	Monoclinic + Orthorhombic + Hexagonal				Orthorhombic
Space group	P112 ₁ /a + Pnma + P6 ₃ /mcm				Pnma
Lattice Parameters					
a(Å)	7.576(1)	7.586(2)	8.353(1)	7.501(4)	
b(Å)	14.787(1)	14.565(4)	8.353(1)	14.743(1)	
c(Å)	7.772(1)	7.643(2)	6.476(1)	7.77(0)	
γ(deg)	93.122(5)	90	120	90	
Volume(Å) ³	869.44(6)	844.68(2)	391.27(6)	859.37(7)	
Residual Parameters					
R _{wp} %	2.16				4.97
R _p %	1.54				3.44

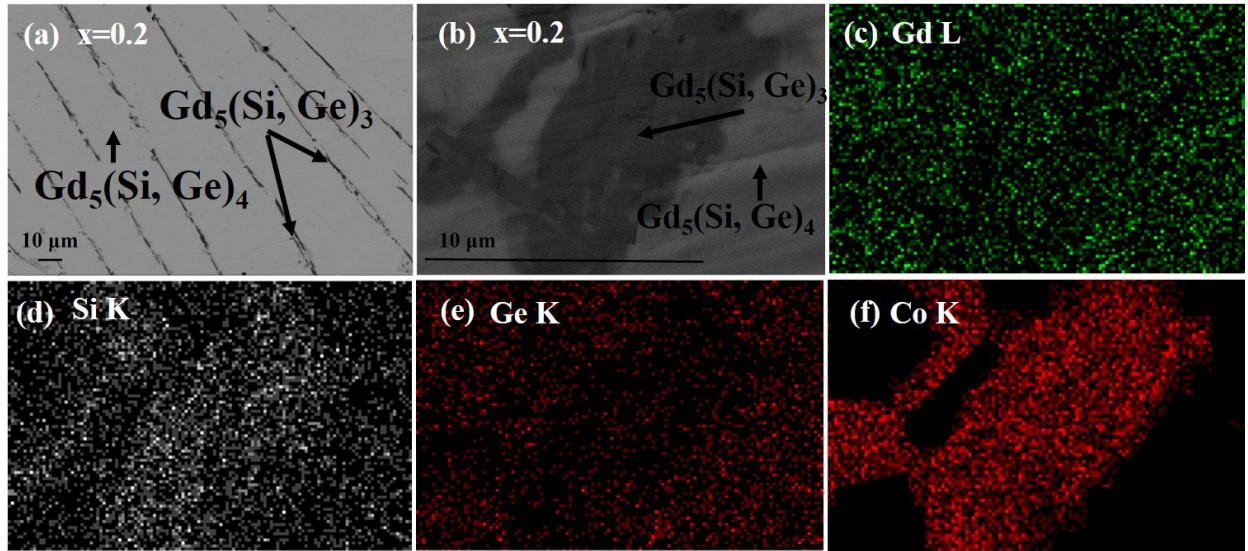


FIG. S2. Back scattered SEM images of $\text{Gd}_5\text{Si}_{2-x}\text{Ge}_2\text{Co}_x$ alloys for (a) $x=0.2$ at low magnification (b) $x=0.2$ at high magnification (c) Gd mapping (d) Si mapping (e) Ge mapping and (f) Co mapping [Matrix phase is 5:4-type, Dark phase is 5:3-type]

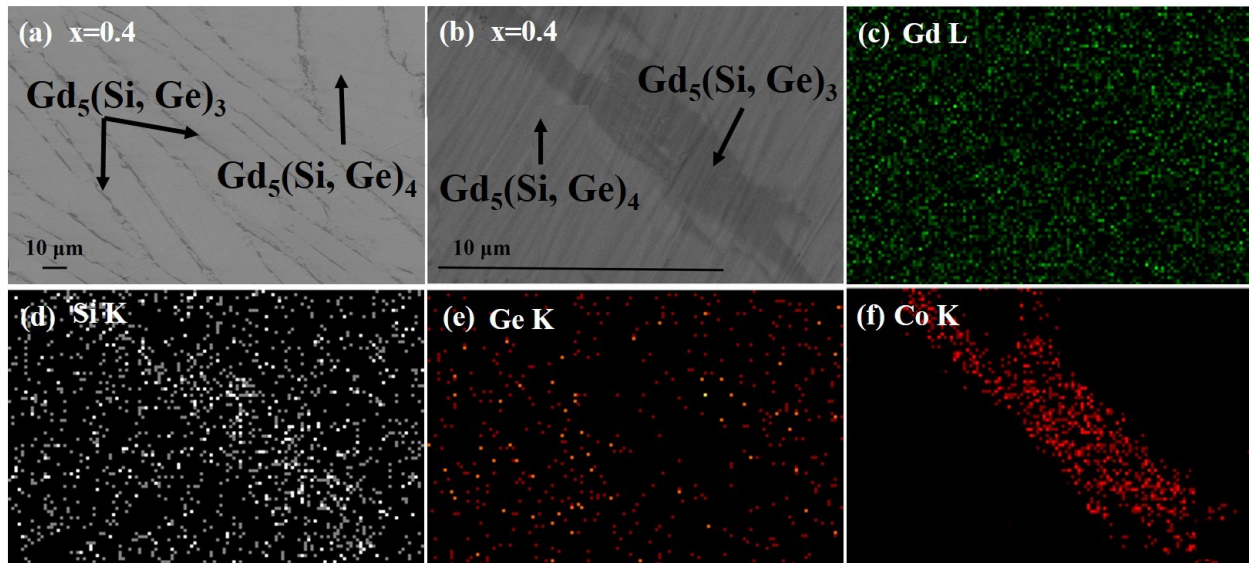


FIG. S3. Back scattered SEM images of $\text{Gd}_5\text{Si}_{2-x}\text{Ge}_2\text{Co}_x$ alloys for (a) $x=0.4$ at low magnification (b) $x=0.4$ at high magnification (c) Gd mapping (d) Si mapping (e) Ge mapping and (f) Co mapping [Matrix phase is 5:4-type, Dark phase is 5:3-type]

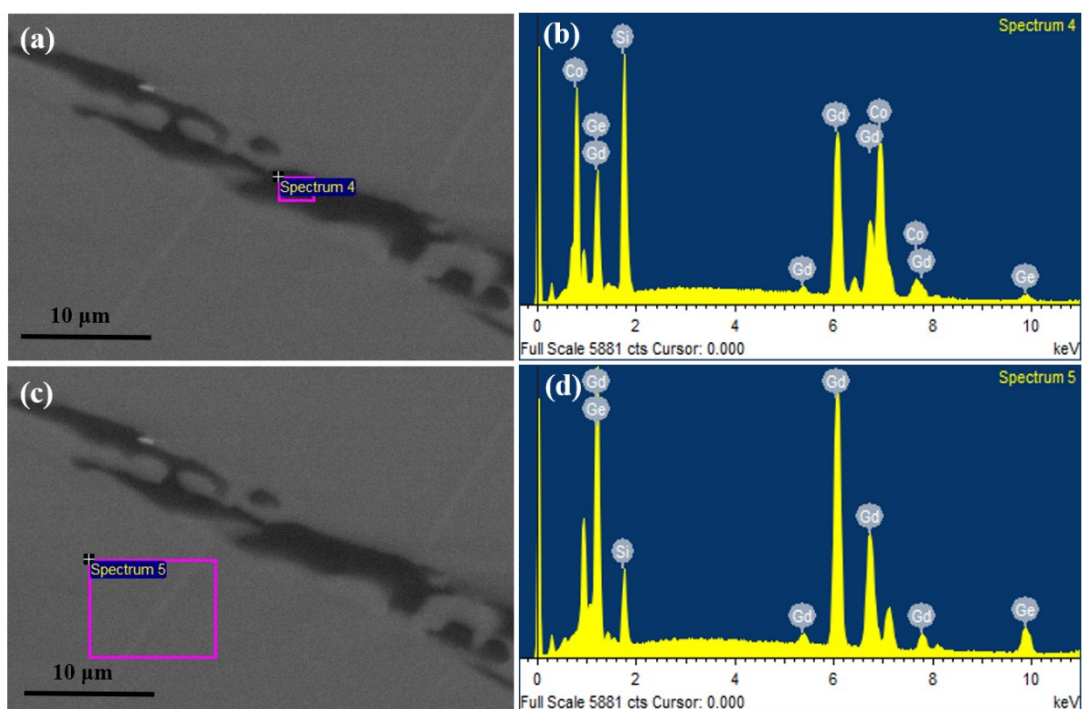


FIG. S4. (a) Backscattered Electron image of $x=0.1$ in (a) the dark grain boundary region and (b) corresponding EDS spectra (c) Matrix phase and (d) corresponding EDS spectra