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Magnetic properties of $\text{Gd}(\text{Fe}_{1-x}\text{Co}_x)_9\text{Ti}_2$ alloys

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Four samples of $\text{Gd}(\text{Fe}_{1-x}\text{Co}_x)_9\text{Ti}_2$ with $x=0.0, 0.1, 0.2,$ and 0.3 were prepared by conventional arc melting followed by annealing at $1000\text{ }^\circ\text{C}$ for 3 days. Powder - x - ray - diffraction patterns of these samples show that all of the samples have a dominant phase with the tetragonal CeMn_6Ni_5 structure. Traces of TiFe_2 are also present. ^{57}Fe Mössbauer spectra have been collected at 80 and 295 K. X - ray - diffraction patterns and Mössbauer spectra on magnetically aligned samples indicate that the easy axis of magnetization is the crystallographic c axis. The Curie temperature increases monotonically with increasing cobalt concentration. The average hyperfine field at 80 K reaches a maximum of $26.8(5)\text{ T}$ for $x\approx 0.2$.