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Re-entrant spin glass state in $(\text{Ce}_{1-x}\text{Tb}_x)\text{Fe}_2$ compounds A. HALDAR, K.G. SURESH, Department of Physics, Indian Institute of Technology Bombay, Mumbai- 400076, India, A.K. NIGAM, Tata Institute of Fundamental Research, Homi Bhabha Road, Mumbai- 400005, India — Doped CeFe_2 compounds are well known for their unique features like first order magneto-structural transition, metastability, supercooling/superheating effects, phase co-existence, glassiness etc. $4f$ band magnetism and the antiferromagnetic ground state as a consequence of this are the interesting features of this system Though doping at the Fe site has been studied extensively, the effect of rare earth (R) substitution at the Ce site is not investigated in detail. We have recently shown that Er substitution causes a spin glass state below its ordering temperature. In this paper, we show that a similar re-entrant spin glass (RSG) phase can be achieved with Tb substitution as well. Characteristic experimental evidences, like large thermo-magnetic irreversibility and strong frequency dependence of ac-susceptibility have been observed. Spin freezing temperature has been found to obey critical slowing down mechanism with relaxation time of the order of 10^{-6} s. The relaxation behavior is also investigated using time variation of dc magnetization. Theoretical fitting of the relaxation data suggests that that the RSG state is made of clusters and not of atomic moments. The RSG state is attributed to the random substitution of Tb in the nearly nonmagnetic Ce sublattice and the modulation of the R-Fe exchange.

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