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Effects of magnetic site disorder of the 1-D Ising spin chain compounds $Ca_3(Co,Mn)_2O_6$ with dilute doping[1] BRIAN CASAS, PAULA LAMPEN, MANH-HUONG PHAN, HARIHARAN SRIKANTH, Univ of South Florida, JOZEF KOVAK, IVAN SKORVANEK, Slovak Academy of Sciences — The spin chain compound $Ca_3Co_2O_6$ has been extensively studied due to a number of unusual properties originating from geometrically frustrated Ising-like spin chains arranged in a triangular lattice. These quasi one dimensional structures provide an ideal environment to study dilute magnetic disorder in spin-glass like systems. Disorder controlled via chemical doping has been observed to weaken the spin glass behavior and disrupt a number of metamagnetic transitions found in pristine $Ca_3Co_2O_6$. We report a systematic study of the effects of dilute Mn doping ($x = 0.05$ – 0.50) in $Ca_3Co_{2-x}Mn_xO_6$ synthesized via a sol-gel method. Detailed AC and DC magnetization measurements performed on a SQUID magnetometer reveal the suppression of the step-like metamagnetic transitions by a doping of $x = 0.25$. The relaxation time is found to decrease with increasing Mn content, showing the destruction of the spin-glass like behavior. Our observations yield new insight into the role of site disorder on the glassy behavior in spin chain systems.

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