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Order by static disorder in the Ising chain magnet $Ca_3Co_{2-x}Mn_xO_6$ V. KIRYUKHIN, S. LEE, H.T. YI, Y.J. CHOI, S-W. CHEONG, Rutgers University, W. RATCLIFF II, Q. HUANG, NIST — Ising chain compound $Ca_3Co_{2-x}Mn_xO_6$ exhibits up-up-down-down long-range magnetic order (LRO) in a broad range of $0.75 < x < 1$. The LRO is abruptly lost in the narrow vicinity of $x=1$, and the magnetic state becomes incommensurate. The commensurate state (but not the LRO) is recovered for larger x. This is surprising because the stoichiometric $x=1$ state exhibits the best Co/Mn ionic order, and the magnetic LRO appears only in the samples with reduced ionic order. We argue that this "order-by-static-disorder" phenomenon may be related to the disruption of the long-range magnetic interactions by the magnetic-site disorder, reducing magnetic frustration.

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