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Frustration and Jahn-Teller ordering in magnetic spinel oxides MOUREEN KEMEI, STEPHANIE MOFFITT, University of California, Santa Barbara, MATTHEW SUCHOMEL, DANIEL SHOEMAKER, Argonne National Laboratory, RAM SESHADRI, University of California, Santa Barbara — Geometrically frustrated magnetic systems have become extremely important for the study of novel phenomena often present in highly degenerate magnetic ground states. Extensive study of the canonically frustrated $ZnCr_2O_4$ and $MgCr_2O_4$ has increased the understanding of frustration in three-dimensional systems, however little is known about the structural effect of dilute magnetism on the A site. We present the effects on magneto-structural coupling of dilute magnetic cations on the diamagnetic A site of $ZnCr_2O_4$ and $MgCr_2O_4$. In $ZnCr_2O_4$ and $MgCr_2O_4$, a spin-driven structural distortion concomitant with the onset of long-range magnetic order resolves the large ground state degeneracy at temperatures far below the theoretical Curie-Weiss temperature. Employing variable temperature high-resolution synchrotron powder diffraction studies and magnetic susceptibility measurements, we show the changes in spin-lattice coupling in the solid solutions $Zn_{1-x}Co_xCr_2O_4$, $Zn_{1-x}Cu_xCr_2O_4$ and $Mg_{1-x}Cu_xCr_2O_4$ for $x \leq 0.2$. These results highlight the effect of dilute A site magnetism on magnetic frustration as well as the role of dilute Jahn-Teller active Cu^{2+} on spin-lattice coupling in these frustrated systems.

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