Title:	Robustness of the spin liquid state with respect to magnetic dilution in the bilayer kagome material Ca10Cr7 O28
Authors:	Balodhi, A. (/jspui/browse?type=author&value=Balodhi%2C+A.) Ali, Anzar (/jspui/browse?type=author&value=Ali%2C+Anzar) Singh, Yogesh (/jspui/browse?type=author&value=Singh%2C+Yogesh)
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Abstract:	Recently, the bilayer kagome lattice material Ca10Cr7O28 has been shown to be a quasi-two-dimensional quantum spin liquid (QSL) where the frustration arises from a balance between competing ferromagnetic and antiferromagnetic exchange within a bilayer. In an attempt to understand what happens when this balance is disturbed, we present a magnetic dilution study. Specifically, we have synthesized Ca10(Cr1−xVx)7O28 (0≤x≤0.5) where magnetic Cr5+ (S=1/2) is partially replaced by nonmagnetic V5+ (S=0). We also synthesized the fully nonmagnetic isostructural material Ca10V7O27.5. We report a detailed structural, magnetic and heat capacity study on these materials. A monotonic increase in the unit cell parameters is found for the Ca10(Cr1−xVx)7O28 materials with increasing x. An order of magnitude decrease in the Curie-Weiss temperature from 4 to 0.5 K is found for the partial V substituted samples, which indicates a relative increase in antiferromagnetic exchange with increase in V content. However, despite this change in the relative balance in the exchange interactions and the large disorder introduced, no magnetic ordering or spin-glass state is observed down to 2 K in the V substituted samples. The QSL state of the parent compound thus seems surprisingly robust against these large perturbations.
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