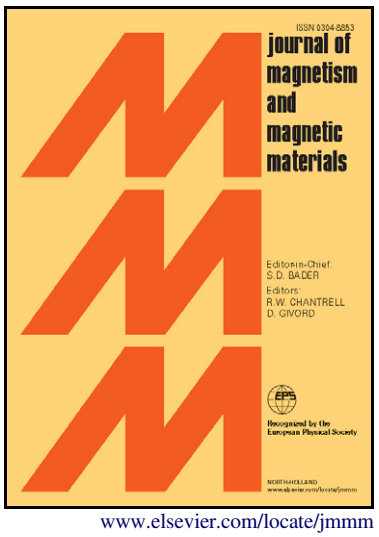

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Magnetic couplings in the quasi-2D triangular Heisenberg antiferromagnets α-ACr_2O_4 (A = Ca, Sr, Ba)

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Abstract

We carried out a comparative study of the A = Ca, Sr, Ba compounds of the α-ACr_2O_4 series, a family of layered chromites, which can be classified as S=3/2 quasi-2D triangular Heisenberg antiferromagnets (2DTHAF). The sizeable distortion, with respect to the perfect triangle lattice, of the spin layer topology can be progressively decreased by increasing the size of A^{2+}, which leads to an increase of both the average distance between nearest-neighbouring Cr^{3+} and of the interplane spacing. The evolution with A^{2+} of the antiferromagnetic transition T_N, the intraplane coupling J, and the interplane coupling J' has been determined on the basis of magnetization and heat capacity measurements and is discussed in the framework of the standard theoretical models describing quasi 2DTHAF.

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