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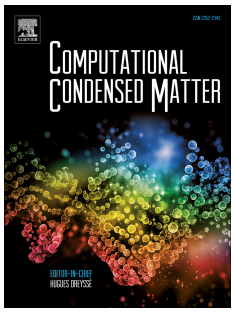

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Magnetic Properties of the rare earth Cerium Orthochromite Perovskite $CeCrO_3$

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Abstract:

In this paper, we study the phase diagrams and the magnetic properties of the rare earth Cerium Orthochromite Perovskite CeCrO3, using Monte Carlo Simulations (MCS). The studied system is considered as a mixture of atoms with the magnetic moment spins S=3/2 for Ce and σ=3/2 for Cr elements, respectively. Firstly, we presented and discussed the ground state phase diagrams in different planes corresponding to the different physical parameters, in the absence of any temperature fluctuations. Moreover, we present and discuss the behavior of the magnetizations as a function of: the temperature, the crystal field, the exchange coupling interactions and the external magnetic field. On the other hand, the critical temperature is calculated and found to be around: $T_c \approx 5$ K corresponding to the maximum value of the susceptibility. Finally, we provide and discuss the hysteresis loops for specific values of the physical parameters.

Keywords:

Rare earth; Cerium Orthochromite; Perovskite; $CeCrO_3$; Mixed Spin; Ground State Phase Diagrams; Monte Carlo simulation; Hysteresis Loops.

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