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Competing short-range magnetic correlations, metamagnetic behavior and spin-phonon coupling in Nd_2CoMnO_6 double perovskite

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Abstract:

We report the presence of ferromagnetic short-range interactions, metamagnetic transitions and spin-phonon coupling on monoclinic polycrystalline Nd_2CoMnO_6 double perovskite. DC thermomagnetic characterization shows a paramagnetic to ferromagnetic transition at T_{C1}~168 K and further to a cluster glass like magnetic transition at T_{C2}~135 K. Griffiths phase like features are also observed, attributed to the presence of competing magnetic interactions. Step like nature observed in the virgin curves of magnetic isotherms implies the presence of meta-magnetic features. Additionally, temperature evolution of Raman spectra signatures spin-phonon coupling extending up to Griffiths like phase region indicating the possibility of magneto-electric coupling in Nd_2CoMnO_6.

Keywords: Nd_2CoMnO_6, ferromagnetism, Griffiths like phase, metamagnetism, spin-phonon coupling