

Direct observation of the electronic phase separation in (La,Pr,Ca)MnO₃ thin film

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Electronic phase separation behavior has been observed in thin film (La,Pr,Ca)MnO₃ system prepared by pulsed laser deposition method.

Crystallographic structure, magnetic structure, and electronic transport properties have been checked and turned out to be consistent with all the previous reports. At low temperature ($T < 150$ K) the ferromagnetic metallic(FMM) phase starts to be nucleated in the background of charge ordered insulating(COI) phase and finally the percolative ferromagnetic phase transition comes up below $T \sim 100$ K.

We investigate the development of magnetic contrast between COI and FMM phase through magnetic force microscopy. In addition, scanning tunneling spectroscopy enables us to identify insulating/metallic state of COI/FMM phase by the observation of local I-V characteristic curve.