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Composition spread studies of $Nd_{1-x}La_xNiO_3$ combinatorial thin films[1] RICHARD SUCHOSKI, MSE Department and CNAM, UMD College Park, KUI JIN, Physics Department and CNAM, UMD College Park, SHINTARO YASUI, MSE Department and CNAM, UMD College Park, RICHARD GREENE, Physics Department and CNAM, UMD College Park, ICHIRO TAKEUCHI, MSE Department and CNAM, UMD College Park — Rare earth nickelates have attracted a great deal of attention in recent years due to a host of interesting features, one being a transition from paramagnetic metal to antiferromagnetic insulator through distortions from the ideal perovskite unit cell. This metal-to-insulator transition (MIT) can be manipulated by modifying variables such as temperature, rare earth ion size, oxygen content, or stress from lattice-mismatched epitaxial thin film growth. Research on this family has been extensive, though there still exists an absence of thin film studies focusing on intermediate compositions. We have fabricated epitaxial thin film composition spreads of $Nd_{1-x}La_xNiO_3$ grown via combinatorial PLD to investigate these transitional compositions. While our films exhibit a smooth composition progression, we observe a composition threshold where orthorhombic $NdNiO_3$ transforms to rhombohedral $LaNiO_3$, correlating with disappearance of the MIT, and displays a non-Vegard evolution of the film's in-plane lattice constant in HRXRD and Raman scattering data of the A_{1g} rotational mode.

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