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Strain control of the metal-insulator transition of NdNiO3 epitaxial ultrathin films JIAN LIU, M. KAREEV, B. GRAY, University of Arkansas, P. RYAN, J.W. KIM, J.W. FREELAND, Argonne National Lab, J. CHAKHALIAN, University of Arkansas — Metal-insulator transition (MIT) is the hallmark of strongly correlated electron systems. It often couples with the multiple degrees of freedom of d electrons in complex oxides, resulting in diverse and intriguing properties. While MIT has been studied for decades, heteroepitaxy is emerging as a promising way to manipulate correlated electrons and stabilize unusual phases in nanostructures. Understanding its effect on the MIT in ultrathin structures is fundamentally and technologically critical. To this end, we have grown perfectly strained atomic layers of NdNiO3 by laser MBE on a series of substrates with large variation in lattice mismatch. The extensive measurements including electric and thermal transport, synchrotron based XRD and XAS show dramatic modifications of electronic properties with lattice mismatch. Possible microscopic mechanisms are discussed. J.C. was supported by DOD-ARO under the Contract No. 0402-17291 and NSF Contract No. DMR-0747808.

Jian Liu
University of Arkansas

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