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Strain-controlled band engineering and Self-doping in Ultrathin LaNiO3 films X. LIU, E.J. MOON, Department of Physics, University of Arkansas, Fayetteville, Arkansas 72701, J.M. RONDINELLI, Department of Materials Science and Engineering, Drexel University, Philadelphia, Pennsylvania 19104, N. PRASAI, Department of Physics, University of Miami, Coral Gables, Florida 33124, B.A. GRAY, M. KAREEV, J. CHAKHALIAN, Department of Physics, University of Arkansas, Fayetteville, Arkansas 72701, J.L. COHN, Department of Physics, University of Miami, Coral Gables, Florida 33124 — We discover a unique self-doping carrier transition by strain-induced in $LaNiO_3$ ultra thin film. Transport properties evolving from compressive to tensile strains are similar to those of different hole-doping superconducting cuprates. DFT calculations show the changes in low-energy electronic band structure account for the charge transfer between O p and Ni d states. The results indicate that ultrathin films can be used to change the carrier concentration transition metal oxides without resorting to chemical substitution.

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