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Thermoelectric response of Lanthanum-doped $SrTiO_3$ thin-films grown under various oxygen partial pressures MATTHEW L. SCULLIN, Dept. of Materials Science and Engineering, University of California, Berkeley, CA 94720, JAYAKANTH RAVICHANDRAN, Dept. of Mechanical Engineering, University of California, Berkeley, CA 94720, MARK HUIJBEN, Dept. of Physics, University of California, Berkeley, CA 94720, CHOONGHO YU, Lawrence Berkeley National Labs, Berkeley, CA, 94720, SUBROTO MUKERJEE, JOEL MOORE, Dept. of Physics, University of California, Berkeley, CA 94720, ARUN MAJUMDAR, Lawrence Berkeley National Labs, Berkeley, CA, 94720, R. RAMESH, Dept. of Materials Science and Engineering, University of California, Berkeley, CA 94720
— Doped strontium titanate is a strong candidate for the next-generation high-Z bulk thermoelectric material due to both its wide tunability in transport properties and very large carrier effective mass. Thermoelectric thin-films of $Sr_{1-x}La_xTiO_{3-\delta}$ with various La content were grown via pulsed-laser deposition (PLD) on (001)-oriented LSAT substrates under various oxygen partial pressures. We find that electron transport is dominated by carriers from oxygen vacancies in samples grown at low $p_{O2} \quad < 10^{-6}$ Torr, and that thermopower as high as 1000 μV/K can be achieved even in heavily La-doped samples. Doping combinations that yield resistivities as low as 5 mΩ-cm yield power factors @ 300K as high as 0.7 W/m-K, implying $ZT > 0.1$.

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