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Thermoelectric properties of doubly doped Strontium Titanate thin films JAYAKANTH RAVICHANDRAN, Applied Science and Technology Graduate Group, University of California, Berkeley, CA 94720, MATTHEW L. SCULLIN, Dept. of Materials Science and Engineering, University of California, Berkeley, CA 94720, SUBROTO MUKERJEE, JOEL MOORE, Dept. of Physics, University of California, Berkeley, CA 94720, R. RAMESH, Dept. of Materials Science and Engineering, University of California, Berkeley, CA 94720, ARUN MAJUMDAR, Dept. of Mechanical Engineering, University of California, Berkeley, CA 94720 — Lanthanum doped Strontium Titanate ($SrTiO_3$) is amongst the most promising n-type thermoelectric materials for power generation. We report a double doping method for thin films of $SrTiO_3$, grown on (001) oriented LSAT substrates by Pulsed Laser Deposition (PLD), where doping of $SrTiO_3$ in the A-site by Lanthanum is accompanied by doping with oxygen vacancies. Based on careful transport measurements, we show that it is possible to obtain enhanced thermoelectric power factor in the limit of high effective mass and large carrier concentration in these thin films. The presence of oxygen vacancies also serves to decrease the thermal conductivity due to effective phonon scattering. The optimized doping concentration leads to a thermoelectric figure of merit, $zT > 0.2$ at room temperature.

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