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Electrical Transport and Magnetoresistance Properties of Tensile-Strained CaMnO3 Thin Films[1] DUSTIN ULLERY, BRIDGET LAWSON, WILLIAM ZIMMERMAN, SAMUEL NEUBAUER, ADEEL CHAUDHRY, CACIE HART, GRACE YONG, VERA SMOLYANINOVA, RAJESWARI KOLAGANI, Towson Univ — We will present our studies of the electrical transport and magnetoresistance properties of tensile strained CaMnO3 thin films. We observe that the resistivity decreases significantly as the film thickness decreases which is opposite to what is observed in thin films of hole doped manganites. The decrease in resistivity is more pronounced in the films on (100) SrTiO3, with resistivity of the thinnest films being about 3 orders of magnitude lower than that of bulk CaMnO3. Structural changes accompanying resistivity changes cannot be fully explained as due to tensile strain, and indicate the presence of oxygen vacancies. These results also suggest a coupling between tensile strain and oxygen deficiency, consistent with predictions from models based on density functional theory calculations. We observe a change in resistance under the application of moderate magnetic field. Experiments are underway to understand the origin of the magnetoresistance and its possible relation to the tensile strain effects.

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Dustin Ullery
Towson Univ

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