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Optical second-harmonic characterization of ferroelectricity in double perovskites $Ca_{2-x}Mn_xTi_2O_6$ YUJIN CHO, FARBOD SHAFIEI, Department of Physics, University of Texas at Austin, ZONGYAO LI, JIANSHI ZHOU, Department of Mechanical Engineering, University of Texas at Austin, MICHAEL DOWNER, Department of Physics, University of Texas at Austin — Perovskite-type ferroelectric oxides such as $BaTiO_3$ are used widely as actuators and memory storage devices. Recently ferroelectricity was demonstrated in the double perovskite $CaMnTi_2O_6$, which represents a fundamental new class of ferroelectrics in which dipoles from Mn^{2+} at the A-site and Ti^{4+} at the B site are cooperatively coupled [1]. However, synthesis of $CaMnTi_2O_6$ from $CaTiO_3$-$MnTiO_3$ required pressure as high as 7GPa. We are developing spark plasma sintering (SPS) methods to synthesize $Ca_{2-x}Mn_xTi_2O_6$ at pressures as low as 50 MPa, and using Second Harmonic Generation (SHG) microscopy to characterize the strength of ferroelectricity. Preliminary SHG results show that ferroelectric $CaMnTi_2O_6$ can be synthesized at low pressure with stronger ferroelectricity achieved with higher x and synthesis pressure. We will present comparative SHG results for SPS-synthesized and high-pressure-synthesized $CaMnTi_2O_6$ and relate them to the underlying origins of ferroelectricity.

[1] A. Aimi *et al.*, Chem. Mat. 26, 2601 (2014).

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