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Investigation of properties of lithium niobate crystals in confined geometries KEITH VEENHUIZEN, Lehigh University, GREG STONE, Pennsylvania State University, BASTIAN KNABE, Department of Microsystems Engineering (IMTEK), SEAN MCANANY, Lehigh University, KARSTEN BUSE, Fraunhofer Institute for Physical Measurement Techniques, HIMANSHU JAIN, VOLKMAR DIEROLF, Lehigh University — The properties of ferroelectric materials in confined geometries, specifically lithium niobate nanocrystals and crystal lines in glass, were studied. Batches of $LiNbO_3$ nanocrystals have been synthesized from various initial ratios of lithium to niobium using the sol-gel method. The batches were analyzed via Raman spectroscopy and SEM imaging to gain information about their size, morphology, stoichiometry, and defect content. The nanocrystals are very sensitive to the initial stoichiometric ratio in the synthesis step. Raman spectra reveal the resultant nanocrystal stoichiometry depends on the initial stoichiometry of the batch, the spectra also reveal an extra phase is present besides $LiNbO_3$ in some batches, and high quality spherical nanocrystals can be synthesized at certain initial stoichiometric ratios. In addition, lines of $LiNbO_3$ were crystallized in lithium-niobo-silica glass systems with varying amounts of silica to understand and control the nucleation and crystallization of the crystals in glass.

Keith Veenhuizen
Lehigh University

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