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Epitaxial Growth of $BaTiO_3/SrTiO_3$ and $BaO/SrTiO_3$ Superlattices for Phonon Confinement[1] A. SOUKIASSIAN, Materials Research Institute, The Pennsylvania State University, N.D. LANZILLOTTI KIMURA, A. BRUCHHAUSEN, A. FAINSTEIN, Centro Atómico Bariloche & Instituto Balseiro, C.N.E.A., Argentina, A. CROSS, A. CANTARERO, Materials Science Inst., University of Valencia, Spain, H.P. SUN, X.P. PAN, Dept. of Materials Science and Engineering, University of Michigan, W. TIAN, D.A. TENNE, X.X. XI, D.G. SCHLOM, Materials Research Inst., The Pennsylvania State University — We discuss the design and material parameters of $BaTiO_3/SrTiO_3$ and $BaO/SrTiO_3$ heterostructures relevant for novel phonon devices, including mirrors, filters, and cavities for coherent phonon generation and control. The advantages of using these ferroelectric superlattices include that they have an enormous stop band compared to the GaAs/AlAs superlattices previously reported for this application and that there can be greatly amplified light-sound interaction in these ferroelectric materials. We have grown $BaTiO_3/SrTiO_3$ and $BaO/SrTiO_3$ superlattices on TiO_2-terminated $SrTiO_3$ substrates by reactive MBE. Structural characterization by XRD and TEM revealed that the samples studied are of high quality with nearly atomically abrupt interfaces. We have observed folded acoustic phonons at the expected frequencies using UV Raman spectroscopy.

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