

Abstract Submitted
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Band structure engineering of LaMnO₃:SrTiO₃ superlattices at the molecular level¹ XIAOFANG ZHAI, CHANDRA MOHAPATRA, F. Seitz Materials Research Laboratory, University of Illinois, Urbana, IL, ANAND BHATTACHARYA, Argonne National Laboratory, Argonne, IL, AMISH SHAH, BIN JIANG, JIANGUO WEN, JIAN-MIN ZUO, JAMES ECKSTEIN, F. Seitz Materials Research Laboratory, University of Illinois, Urbana, IL — We have made single crystal short period superlattices consisting of alternating slabs of LaMnO₃ and SrTiO₃, using atomic layer by layer molecular beam epitaxy. The supercells consist of N-layers of each component, with N=1, 2, 3, 4. Ellipsometric measurements of the new materials show that optical absorption in the visible light range is significantly different from bulk LaMnO₃ or SrTiO₃, and depends on N. The new band structure is dependent on the superlattice design. This is an example of engineered coherent “meta-materials”, and this fabrication technique can be extended to other lattice matched transition metal oxides with a wide range of conducting and magnetic properties.

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