World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:8, No:05, 2014

Two-Dimensional Electron Gas with 100% Spin- Polarization in the (LaMnO3)2/(SrTiO3)2 Superlattice under Uniaxial Strain

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Abstract : By first-principles calculations we investigate the structural, electronic, and magnetic properties of the (LaMnO3)2/(SrTiO3)2 superlattice. We find that a monoclinic C2h symmetry is energetically favorable and that the spins order ferromagnetically. Under both compressive and tensile uniaxial strain the electronic structure of the superlattice shows a half-metallic character. In particular, a fully spin-polarized two-dimensional electron gas, which traces back to the Ti 3dxy orbitals, is achieved under compressive uniaxial strain.

Keywords : manganite, strain, 2DEG, superlattice
Conference Title : ICMSCMP 2014 : International Conference on Material Science and Condensed Matter Physics
Conference Location : Berlin, Germany
Conference Dates : May 22-23, 2014