

Abstract Submitted
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Formation of 2DEG at the interface of unconventional oxide hetero-structures by atomic layer deposition.¹ FARIDA SELIM, DAVE WINARSKI, Department of Physics and Astronomy, Bowling Green State University, Ohio, USA, KEVIN LEEDY, DAVID LOOK, Air Force Research Laboratory Sensors Directorate, Wright-Patterson Air Force Base, SELIM TEAM, LEEDY COLLABORATION — Two-dimensional electron gases (2DEGs) with a sheet carrier density of 10^{14} cm⁻² and high electron mobility have been realized at the interface of SrTiO₃ and Al₂O₃ films grown by atomic layer deposition at very low temperatures. Possible origins for the high electron densities will be discussed. By controlling the interface, the sheet resistance exhibited a wide range of change from 10^3 to 10^{13} Ω/square. Temperature dependent Hall-effect measurements revealed metallic conduction and metal-semiconductor transitions. The effect of growth parameters, surface conditions, and film thickness on the transport properties of the interface will be discussed.

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