

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Structures, Properties and Defects of SrTiO₃/GaAs Hetero-interfaces¹ LIANG HONG, University of Illinois at Chicago, KUNAL BHATNAGAR, RAVI DROOPAD, Texas State University, SERDAR ÖĞÜT, ROBERT KLIE, University of Illinois at Chicago — SrTiO₃ thin film can be epitaxially grown on GaAs substrate and used as a platform for growing other oxides to create functional metal-oxide-semiconductor devices, where a high-quality SrTiO₃/GaAs interface is essential. We studied the structural and electronic properties of SrTiO₃/GaAs hetero-interfaces at atomic level using scanning transmission electron microscopy and first-principles calculations. Our results suggest the preferred termination of GaAs (001) is significantly dependent on the oxygen concentration in the first oxide layer. The favorable interface structure is characterized as oxygen-deficient SrO in contact with arsenic and is observed in both experiment and simulation. The electronic properties are calculated and found to be tunable by interfacial defects such as oxygen, gallium and arsenic vacancies.

¹This work was supported by the National Science Foundation (Grant No. DMR-1408427). This work made use of instruments in the Electron Microscopy Service and the High Performance Computing Clusters at University of Illinois at Chicago.

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Date submitted: 10 Nov 2016

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