Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Superconducting single crystalline YBa2Cu3O7-δ on SrTiO3 buffered Si (100) MOHAMMADREZA JAHANGIR MOGHADAM, KAMYAR AHMADI MAJLAN, Univ of Texas, Arlington, HAO ZHANG, Univ of Toronto, XUAN SHEN, National Laboratory of Solid State Microstructures, Nanjing University, MATTHEW CHRYSLER, PATRICK CONLIN, RICKY HENSLEY, Univ of Texas, Arlington, DONG SU, Center for Functional Nanomaterials, Brookhaven National Laboratory, JOHN WEI, Univ of Toronto, JOSEPH NGAI, Univ of Texas, Arlington — The growth of crystalline oxides on semiconductors enables new functionalities to be integrated with semiconducting technologies. Here, thin films of optimally-doped (001)-oriented YBa2Cu3O7-δ are epitaxially integrated on silicon (001) through growth on a SrTiO3 buffer. The former is grown using pulsed-laser deposition and the latter is grown on Si using oxide molecular beam epitaxy. The single crystal nature of the SrTiO3 buffer enables very high transition temperatures to be achieved. For a 30 nm thick SrTiO3 buffer, YBa2Cu3O7-δ films exhibiting a transition temperature of $\sim$ 95 K, and a narrow transition width (<5 K) are achieved. The integration of single crystalline YBa2Cu3O7-δ on Si (001) paves the way for the potential exploration of cuprate materials in a variety of applications.

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Date submitted: 12 Nov 2014 Electronic form version 1.4