Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Synthesis and superconductivity in spark plasma sintered pristine and graphene-doped $FeSe_{0.5}Te_{0.5}$ POOJA PUNEET, RAMAKRISHNA PODILA, JIAN HE, APPARAO RAO, Clemson University, AUSTIN HOWARD, NICHOLAS CORNELL, ANVAR A. ZAKHIDOV, University of Texas at Dallas, DEPARTMENT OF PHYSICS AND ASTRONOMY, CLEMSON NANOMATERIALS CENTER, CLEMSON UNIVERSITY TEAM, NANOTECH INSTITUTE, UNIVERSITY OF TEXAS AT DALLAS TEAM — Replace this text with your abstract body. Here, we present a new ball-milling and spark plasma sintering based technique for the facile synthesis $FeSe_{0.5}Te_{0.5}$ superconductors (SC) without the need for pre-alloying. This method is advantageous since it is quick and flexible for incorporating other dopants such as graphene for vortex pinning. We observed that $FeSe_{0.5}Te_{0.5}$ exhibits a coexistence of ferromagnetic (FM) and SC signature plausibly arising from a FM core-SC shell structure. More importantly, the Hc2 values observed from resistivity data are higher than 7 T indicating that SPS process synthesized $FeSe_{0.5}Te_{0.5}$ samples could lead to nextgeneration superconducting wires and cables.

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Date submitted: 14 Nov 2014 Electronic form version 1.4