Abstract Submitted
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Inducing structural collapse and superconductivity in $CaFe_2As_2$ by systematic substitutions of rare earths SHANTA SAHA, TYLER DRYE, NICHOLAS BUTCH, RONGWEI HU, KEVIN KIRSHENBAUM, STEVEN ZIEMAK, JOHNPIERRE PAGLIONE, Center for Nanophysics and Advanced Materials, Dept. of Physics, University of Maryland, College Park, MD 20742, PETER ZAVALIJ, Dept. of Chemistry and Biochemistry, University of Maryland, College Park, MD 20742, JEFFREY LYNN, NIST Center for Neutron Research, Gaithersburg, MD 20899 — Recently, we have reported structural collapse and 47 K superconductivity in $CaFe_2As_2$ by aliovalent rare earth substitutions for Ca atoms [1]. We will present the evolution of structural and superconducting properties in single crystals of $CaFe_2As_2$ by systematic substitutions of R (=La, Ce, Pr, and Nd) for Ca, causing electron doping that is indirect to FeAs layer. Effect of annealing, growth method, etching, and pressure on $Ca_{1-x}R_xFe_2As_2$, indicating the intrinsic nature of this high Tc superconductivity, the highest in 122 Fe-based materials, will be discussed. Ref. [1] S. R. Saha *et al.* arXiv:1105.4798.

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