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In-plane structural and electronic anisotropy in de-twinned $CaFe_2As_2$ compounds ERICK BLOMBERG, M.A. TANATAR, S. RAN, S.L. BUD'KO, P.C. CANFIELD, R. PROZOROV, The Ames Laboratory, Ames, IA 50011, USA — In-plane structural and electronic anisotropy has been studied in a wide range of iron-based superconductors by detwinning via uniaxial stress or strain [1]. In particular, materials based on $BaFe_2As_2$ ("112") are among the most studied systems, where different dopants, annealing protocols and different flux growths were extensively explored. However $CaFe_2As_2$ remains a much less studied compound and it exhibits properties quite different from Ba-based 122's [2]. Here we report polarized-light microscopy and electric transport measurements of strain-detwinned $CaFe_2As_2$ compounds. Our results reveal unusual evolution of the structural, electronic and magnetic properties dependent on annealing, growth from Sn flux vs FeAs flux, and doping, as compared to $BaFe_2As_2$. Among the key observations are the differences in twin domain evolution, and a hysteresis in structural and electronic anisotropy upon warming and cooling. This work was supported by the Department of Energy Office of Science, Basic Energy Sciences under Contract No. DE-AC02-O7CH11358.

[1] M. A. Tanatar, E. C. Blomberg, et. al. Phys. Rev. B 81, 184508 (2010).
[2] S. Ran, et. al. Phys. Rev. B 85, 224528 (2012).

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