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Novel structural transformation in the ultrathin films of cuprates and its influence on electronic and magnetic properties D. SAMAL, University of Twente, TAN HAIYAN, University of Antwerp, H. MOLEGRAAF, B. KUIPER, University of Twente, W. SIEMONS, Oak Ridge National Lab, SARA BALS, JO VERBEECK, GUSTAAF VAN TENDELOO, University of Antwerp, Y. TAKAMURA, University of California, Davis, ELKE ARENHOLZ, CATHERINE JENKINS, Advanced Light Source, G. RIJNDERS, GERTJAN KOSTER, University of Twente — We report on the evidence found for structural transformation in ultrathin films of two cuprate systems viz. $SrCuO_2$(SCO) and CuO. In case of SCO ultrathin films, we show a transformation from the bulk planar to chain-like structure, below a critical thickness, due to associated electrostatic instability. Results based on X-ray diffraction, X-ray photoelectron diffraction and scanning transmission electron microscopy reveal an elongation of the unit cell by $\sim$0.5Å along the c-axis and the presence of oxygen in the Sr plane for chain like structure. Polarized X-ray absorption spectroscopy reveals a preferential occupation of Cu $3d_{3z^2-r^2}$ orbital in case of the chain like structure unlike to the planar one. For the case of ultrathin CuO films, we find strain induced structural transformation from monoclinic to tetragonal phase, akin to other 3d transition metal monoxides and reveals relatively higher Neel temperature. Our findings point to a unique structural stabilization process for ultrathin cuprate layers and provide new insight for the experimental realization of novel hybrids to look for enhanced superconducting properties. References: Zhong *et.al,* PRB **85,** 12411(R) (2012); Siemons *et.al,* Al.PRB **79**,195122 (2009)

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