Abstract Submitted
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Identify the chemical and electronic inhomogeneity in optimally Co doped $BaFe_2As_2$ QIANG ZOU, Oak Ridge National Laboratory, ZHIMING WU, Oak Ridge National Laboratory, Xiamen University, MINGMING FU, CHUNMIAO ZHANG, Xiamen University, SHIVANI RAJPUT, Oak Ridge National Laboratory, YAPING WU, Xiamen University, LI LI, D. PARKER, Oak Ridge National Laboratory, JUNYONG KANG, Xiamen University, A.S. SEFAT, ZHENG GAI[1], Oak Ridge National Laboratory, MSTD, OAK RIDGE NATIONAL LABORATORY COLLABORATION, XIAMEN UNIVERSITY COLLABORATION, CNMS, OAK RIDGE NATIONAL LABORATORY COLLABORATION — Combined scanning tunneling microscopy, spectroscopy and local barrier height (LBH) image studies show that low temperature cleaved optimal doped $Ba(Fe_{1-x}Co_x)_2As_2$ single crystals have complicate morphologies, by means of the mixture of the Ba dominated bright patches and As dominated stripes. Although the surface morphologies are different, the superconducting gap maps show same gap width and similar nanometer size inhomogeneity. Based on the spectroscopy and LBH maps, the bright patches and dark stripes variations in the morphologies were identified as Ba or As dominated surface terminations. Magnetic impurities are believed to create local in-gap state and suppressed coherent peaks of the SC. This study will clarify the debate on the terminations of the cleavage surface of the Fe based 122 superconductors. This research was conducted at the Center for Nanophase Materials Sciences, which is a DOE Office of Science User Facility.

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