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Surface effect of epitaxially grown BaFe₂As₂ surface – Scanning Tunneling Microscopy and Spectroscopy study SUNGMIN KIM, SUNWOUK YI, MINJUN LEE, HANHO LEE, HOYEON JEON, YONGCHAN YOO, INHAE ZOH, CHAO ZHANG, MYUNGCHUL OH, YOUNG KUK, Department of Physics and Astronomy, Seoul National University — The electronic properties of Co-doped BaFe₂As₂ (BFCA) iron pnictide superconductors were studied using scanning tunneling microscopy and spectroscopy. BFCA samples with superconducting transition temperatures 22-27 K, were grown on SrTiO₃(100) by pulsed laser deposition (PLD) growth under ultrahigh vacuum condition. As-grown surfaces revealed 2×2 or $2\sqrt{2} \times 2\sqrt{2}$ structures as a function of bias voltage at 4.3 K. Missing row structures were also observed on as-grown samples, suggesting many nucleation sites and resultant antiphase boundaries. The I-V and dI/dV spectra were deviated from the bulk spectrum obtained by contact conductance measurement. After removing surface layers by ion beam sputtering, different spectra were observed. The obtained spectra were explained with the surface state effect in BFCA samples as compared with DFT calculations.

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