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Superconducting and structural properties of $\text{FeSe}_x\text{Te}_{1-x}$ epitaxial thin films QIANG LI, WEIDONG SI, Brookhaven National Laboratory — We report magnetoresistive, critical current density, and structural measurements of superconducting $\text{FeSe}_{1-x}\text{Te}_x$ epitaxial thin films grown by pulsed laser deposition. Enhanced onset superconducting transition temperature (~ 17 K) is observed in $\text{FeSe}_{0.5}\text{Te}_{0.5}$ epitaxial thin films. Structural analysis by x-ray diffraction and high resolution transmission electron microscopy reveal that these films generally have significantly shorter out-of-plane lattice constant than the bulk value, suggesting that the out-of-plane changes have a dominating impact on the superconducting transition in iron-based superconductors. Our data also indicate that the upper critical field $H_{c2}(0)$ of those films may reach over 50 T. Flux pinning properties of these films are examined with the help of detailed structural analysis.

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