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Freestanding single-crystal $YBa_2Cu_3O_{7-x}$ thin films BAI YANG WANG, ZHUOYU CHEN, DI LU, SEUNG SAE HONG, Stanford Univ., YASUYUKI HIKITA, SLAC Nat. Acc. Lab., HAROLD HWANG, Stanford Univ. and SLAC Nat. Acc. Lab., HWANG TEAM — Perovskite oxide thin films and atomic-scale heterostructures have been the focus of much recent interest as ideal platforms for studying correlated electrons in low dimensions. Recently, new methods have been developed to synthesize them as freestanding single-crystal films [1]. This may enable the design of new experiments, such as applying previously inaccessible levels of strain. Here, we report the synthesis of freestanding single-crystal thin films of the high temperature superconductor $YBa_2Cu_3O_{7-x}$ (YBCO). By epitaxially growing a soluble sacrificial layer of $Sr_3Al_2O_6$ between YBCO and the $SrTiO_3$ substrate using pulsed laser deposition, the YBCO layer can be lifted off in freestanding form. The millimeters-scale freestanding YBCO film can then be transferred onto other structures, including platforms for the application of strain - the resulting magnetotransport properties will be reported. [1] Di Lu et al., Nature Mater. doi:10.1038/nmat4749 (2016).

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