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Ferroelastic Switching in a Layered-perovskite Thin Film

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时间：4月7日（星期四）15:00–16:30

地点：北京大学物理大楼中212教室

简介： 近五年来，张金星教授在北京师范大学和加州大学伯克利分校工作期间，以通讯作者在Nature Nanotechnology, Nature Communications, Physical Review Letters, Advanced Functional Materials等期刊发表论文，以合作作者在Science, Nature Materials, PNAS等期刊发表论文。共发表文章近40篇，引用1600次左右。2012年入选第二批中组部青年千人计划，2014年入选基金委优秀青年基金。主要研究兴趣与方向是复杂氧化物薄膜及异质结的外延生长，畴壁与相界的构筑，探索其在信息技术、能源转化、传感驱动等方面的应用。

摘要:A controllable ferroelastic switching in ferroelectric/multiferroic oxides is highly desirable due to the non-volatile strain and possible coupling between lattice and other order parameter in heterostructures. However, a substrate clamping usually inhibits their elastic deformation in thin films without micro/nano-patterned structure so that the integration of the non-volatile strain with thin film devices is challenging. Here, we report that reversible in-plane elastic switching with a non-volatile strain of approximately 0.4% can be achieved in layered-perovskite Bi_2WO_6 thin films, where the ferroelectric polarization rotates by 90° within four in-plane preferred orientations. Phase-field simulation indicates that the energy barrier of ferroelastic switching in orthorhombic Bi_2WO_6 film is ten times lower than the one in $PbTiO_3$ films, revealing the origin of the switching with negligible substrate constraint. The reversible control of the in-plane strain in this layered-perovskite thin film demonstrates a new pathway to integrate mechanical deformation with nanoscale electronic and/or magnetoelectronic applications.

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