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Growth and Characterization of Magnetoelectric Fe_2TeO_6 Thin Films[1] JUNLEI WANG, JUAN COLON SANTANA, NING WU, PETER DOWBEN, CHRISTIAN BINEK, University of Nebraska — Voltage-controlled spintronics is of vital importance in information technology where power consumption and Joule heating restrict progress through scaling. Motivated by spintronic concepts and specifically by device applications utilizing electrically controlled interface or boundary magnetization (BM) in magnetic thin film heterostructures, we report on growth, structural, magnetic and magnetoelectric (ME) characterization of the antiferromagnet Fe_2TeO_6. Magnetometry of synthesized Fe_2TeO_6 powder, in combination with ME susceptibility data reveals 3D Heisenberg criticality in striking similarity to the archetypical ME chromia. X-ray diffraction shows (110) texture of the PLD grown films. Measurements of the magnetic susceptibility of the latter confirm in-plane magnetic anisotropy. X-ray photoemission spectroscopy indicates a Te-O terminated (110) surface. We interpret it in terms of surface reconstruction. Measurements of X-ray magnetic circular dichroism combined with photoemission electron microscopy support the presence of electrically controllable BM in the PLD-grown Fe_2TeO_6 thin film.

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