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Growth and Characterization of Magnetoelectric Fe_2TeO_6 Thin Films[1] JUNLEI WANG, PETER DOWBEN, CHRISTIAN BINEK, University of Nebraska-Lincoln — Promising spintronic concepts such as Cr_2O_3 based voltage-controlled exchange bias systems [1] employ electric controlled boundary magnetization. Symmetry arguments reveal that equilibrium boundary magnetization is a generic property of magnetoelectric antiferromagnets [2]. However, experimental evidence of boundary magnetization is scarce and microscopic evidence has only been provided for the Cr_2O_3 (0001) surface [3]. In order to bring the concept of boundary magnetization into a broader experimental context we prepare the magnetoelectric antiferromagnet $Fe_2TeO_6$with tri-rutile structure. We use two distinct approaches for the thin film growth, RF sputtering and pulsed laser deposition (PLD). Both methodologies start from targets which we prepare from sintered powder of Fe_2TeO_6 produced in a solid-state reaction. We characterize the magnetoelectric thin film of Fe_2TeO_6 structurally, magnetically and magnetoelectrically using XRD, SQUID, RHEED, LEED and MOKE. Our investigation aims on an experimental test of the predicted generality of the equilibrium boundary magnetization in magnetoelectric antiferromagnets.

[1] He, Xi *et al.*, Nature Materials 9, 579 - 585 (2010)
[2] Belashchenko, K.D., Phys. Rev. Lett. 105, 147204 (2010)
[3] Wu N. *et al.*, Phys. Rev. Lett. 106, 087202 (2011)

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[X] Prefer Oral Session
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