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Direct observation of strain-induced magnetic domain evolution in Heusler shape memory compounds C.A. JENKINS, A. SCHOLL, A. DORAN, Lawrence Berkeley National Laboratory, T. OMORI, Graduate School of Engineering, Tohoku University Sendai — The magnetic domain structure in single crystals of a novel Heusler magnetic shape memory (MSM) compound Fe_2MnGa was observed to undergo strain-induced evolution by synchrotron-based photoelectron emission microscopy (PEEM) at Beamline 11.0.1 of the Advanced Light Source. PEEM can produce high resolution, surface-sensitive images reflecting the spatial distribution of magnetism, and a custom flexure rig has been designed for in situ actuation and simultaneous observation of MSM. System energy of an MSM compound is lowered when the volume fraction of the favorably oriented martensitic variant is increased: intermartensitic twin boundary motion is energetically easier than magnetic rotation so magnetic domains evolve not by domain wall motion but by propagation of planar structural defects called twin boundaries. In this ternary MSM intermetallic the direction of tetragonal distortion, which is coupled to the magnetic easy axis, will lie favorably along the axis of compression as defined by the action of the custom rig. The disappearance of unfavorably oriented orthogonal magnetic domains with strain is then observed as expected.

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