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Multiferroic Effects in W-type Hexagonal Ferrites YIYAN SUN, YOUNG-YEAL SONG, ZIHUI WANG, DARYL FREEMAN, MINGZHONG WU, Colorado State University — One major advance in the field of multiferroics in recent years is the discovery of multiferroic effects in hexagonal ferrites. The crystal structures of hexagonal ferrites can be described as the superposition of certain fundamental blocks, each containing several close-packed layers stacked in a specific sequence. Based on the way how different blocks are stacked to form a unit cell, one can classify hexagonal ferrites into six main types: M, W, Y, Z, X, and U. Within these six types, M-, Y-, Z-, and U-type hexagonal ferrites have proved to be multiferroic. This presentation reports for the first time multiferroic effects in W-type hexagonal ferrites. The sample was a 150 μm-thick Co_2W hexagonal ferrite slab cut from a single-crystal bulk. X-ray diffraction measurements confirmed the crystal structure and indicated that the hexagonal c axis was along the slab normal. Static magnetic measurements indicated that the slab plane was an easy plane, and the saturation induction was 4300 G. The ferroelectric nature was confirmed by hysteresis behavior in dielectric constant vs. electric field measurements. The magneto-electric coupling manifests itself as two distinct effects: (1) a change in dielectric constant with a magnetic field applied in the easy plane, and (2) a shift in the ferromagnetic resonance field with the bias voltage applied across the slab.

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