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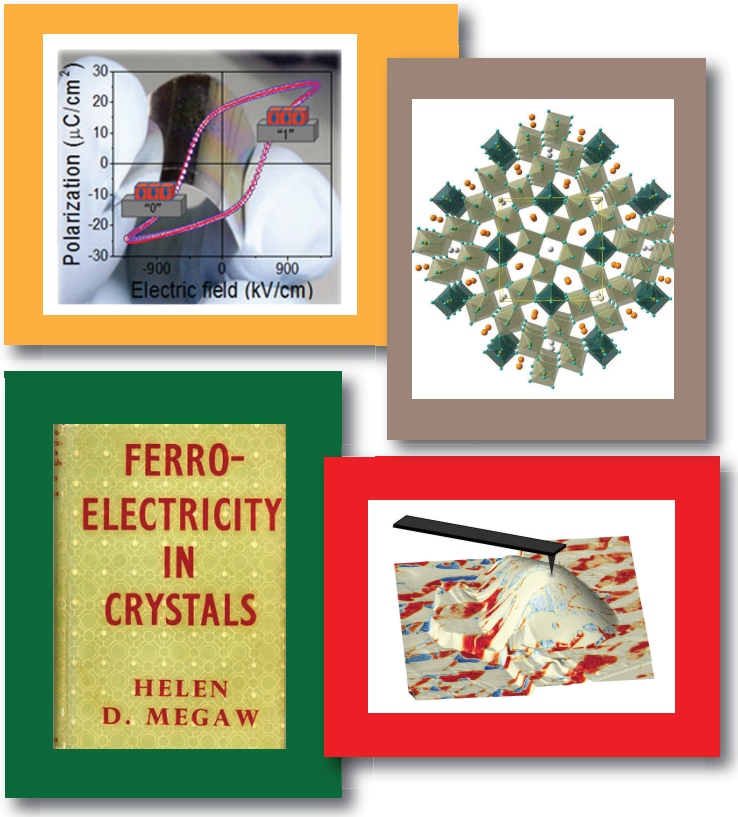
SPECIAL ISSUE:
Contributions of Women in
Ferroelectrics Research and Development



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Special Issue on the Contributions of Women in Ferroelectrics Research and Development

The cover of this issue highlights artwork and pictures from select manuscripts included in the IEEE TUFFC Special Issue on the Contributions of Women in Ferroelectrics Research and Development. The images are representative of crystallographic structure, advanced characterization techniques, ferroelectrics properties and integration, and a historical book in ferroelectrics. Brief summaries of each image appear below.

Upper left: In the background is a photograph of a ferroelectric lead zirconate titanate thin film that is deposited amorphous and then crystallized on a flexible polyimide substrate. Solution deposition using precursor solutions with photosensitive seeds allows subsequent crystallization at temperatures as low as 350° C. Inset plot shows the polarization vs. electric field hysteresis loop, which demonstrates robust ferroelectricity. Image from Fig. 8(c) of Bretos, Jiménez, Ricote, and Calzada (DOI: 10.1109/TUFFC.2020.2995287).

Upper right: Schematic of the crystal structure of the tetragonal tungsten-bronze family ferroelectric, $(Sr_xBa_{1-x})_5Nb_{10}O_{30}$ (SBN). The schematic shows three types of channels along the c-axis of the unit cell. Triangular channels are empty. Square channels (A1 site) and pentagonal (A2 site) channels are each filled with Sr and Ba. The schematic also shows two types of NbO_6 octahedra (dark and light), corresponding to two different crystallographic sites (B1 and B2, respectively). The structure of this material was reinvestigated using scattering and spectroscopic techniques (diffuse scattering, Raman, infrared and high-frequency dielectric spectroscopies) to determine the nature of the ferroelectric-relaxor transformation. Image from Fig. 1 of Buixaderas and Paściak (DOI 10.1109/TUFFC.2020.2984829).

Lower left: Photograph of the cover of the 1957 book *Ferroelectricity in Crystals*, written by Helen D. Megaw (1907–2002). Megaw was a pioneer in crystallography and a leading researcher in the field of ferroelectrics. During World War II, Megaw determined the crystal structure of the industrially significant material known as Barium Titanate. Later, Megaw studied the structures and phase transitions in $KNbO_3$, $NaNbO_3$, $LiNbO_3$, and Ca_2NbO_7, which contributed to the understanding of the structural basis for ferroelectricity. Her life and contributions to the field of ferroelectrics is reviewed by Mike Glazer in this Special Issue (DOI: 10.1109/TUFFC.2020.3035268).

Lower right: Schematic of a Piezoresponse Force Microscopy (PFM) experiment on a van der Waals ferroelectric material, $CuInP_2S_6$. In-plane strain causes delamination as well as wrinkling and bubbling at the surface. The strained (not delaminated) and unstrained (delaminated) areas can be interrogated by PFM. The experiment reveals that tensile strain lowers the Curie temperature of $CuInP_2S_6$ and reinforce the opportunities for strain engineering to tune functionality on the micro- and nanoscale. Image contributed by Neumayer, Susner, McGuire, Pantelides, Kalnaus, Maksymovych, and Balke (DOI: 10.1109/TUFFC.2020.3007290).