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# Ferroic materials at high pressures

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In this contribution, we will review our single-crystal studies of various (multi)ferroic materials as a function of pressure and temperature.

Ferroic phase transitions are characterized by the reduction of crystal symmetry very often associated with the appearance of a twin domain structure and/or an incommensurate structure. In addition, the low-symmetry phase usually shows a pronounced pseudo-symmetry with respect to the higher symmetry phase. Twinning, incommensurability, and high pseudo-symmetry could thus be understood as an indication of the existence of structural instabilities in the material under certain temperature and/or pressure conditions.

The transitions involving a symmetry reduction within the same diffraction class, which are not accompanied by the appearance of additional reflections, are very difficult to detect as they are exclusively reflected in changes of intensities in the diffraction diagrams. Observations of such transitions in high-pressure powder diffraction experiments have rarely been reported. Single-crystal diffraction, however, is suitable for such cases provided the data are of sufficient quality. An example is our study of the pressure-induced phase transitions in mixed valence vanadates  $\text{NaV}_6\text{O}_{11}$  and  $\text{BaV}_6\text{O}_{11}$ .

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