

Diffraction Study of Organic Ferroelectrics using Synchrotron Radiation

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Organic ferroelectric materials have recently attracted for not only basic science but also the application to modern organic electronic devices[1]. At present, however, there are only a few organic ferroelectric materials available. The origin of ferroelectricity in the organic materials is strongly related to its crystal structure. In the TTF-CA, which is a prototypical charge-transfer type organic ferroelectrics, spatially separated positive and negative charge centers, generated resultant from the neutral-ionic transition, in the compound leads to ferroelectricity[2]. On the other hand, hydrogen-bonded supramolecular type organic ferroelectrics, Phz-H₂xa, displacement of hydrogen in the intermolecular O – H···N bonds plays an important role for emergence of ferroelectricity[3]. Therefore, the investigation of crystal structure of organic ferroelectrics is essential to understand the origin of polarization and to establish a design of new organic ferroelectric materials.

We have revealed the modulation of structure for organic ferroelectric crystals under the external field, pressure, electric field and temperature, to clarify the mechanism for the alignment of dipoles by using synchrotron radiated X-ray. Diffraction studies under extreme conditions were carried out at BL-8A, PF in KEK with use of an IP diffractometer. In this poster, we will present the structural property of TTF-CA under electric fields and recent research topics of the other organic ferroelectrics.

This work was partly supported by the Japan Society for the Promotion of Science (JSPS) through its "Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program)."

References

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