Tamotsu Inabe, J Material Sci Eng 2016, 5:8 (Suppl)
http://dx.doi.org/10.4172/2169-0022.C1.049

Directionally tunable and mechanically deformable ferroelectric crystals from rotating polar globular ionic molecules

Tamotsu Inabe
Hokkaido University, Japan

Ferroelectrics are used in a wide range of applications, including memory elements, capacitors and sensors. Recently, molecular ferroelectric crystals have attracted interest as viable alternatives to conventional ceramic ferroelectrics because of their solution processability and lack of toxicity. Here, we show that a class of molecular compounds known as plastic crystals can exhibit ferroelectricity if the constituents are judiciously chosen from polar ionic molecules. The intrinsic features of plastic crystals, for example, the rotational motion of molecules and phase transitions with lattice-symmetry changes, provide the crystals with unique ferroelectric properties relative to those of conventional molecular crystals. This allows a flexible alteration of the polarization axis direction in a grown crystal by applying an electric field. Owing to the tunable nature of the crystal orientation, together with mechanical deformability, this type of molecular crystal represents an attractive functional material that could find use in a diverse range of applications.

Biography

Tamotsu Inabe has completed his PhD in 1981 from Hokkaido University, Japan, and Post-doctoral studies from Northwestern University (1981¬–1984). He is a full Professor from 1993 at the Division of Chemistry, Faculty of Science, Hokkaido University. He has published more than 250 papers mainly in the field of Solid-State Chemistry. He was honored A. K. Doolitle Award from A.C.S. and The Chemical Society of Japan Award for Creative Work. His research interest includes "Solid-state chemistry of molecular materials, crystal design, and electronic functional materials".

inabe@sci.hokudai.ac.jp

Notes: