Abstract Submitted
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Dielectric anomaly and structural change related to the Jahn-Teller transition in $DyVO_4$ KAZUMASA KISHIMOTO, TAISHI ISHIKURA, HIROYUKI NAKAMURA, YUSUKE WAKABAYASHI, TSUYOSHI KIMURA — RVO_4 system has been studied as dielectrics for several decades. Among them, $DyVO_4$ having Dy^{3+} ($4f^9$) and V^{5+} ($3d^0$) ions shows the Jahn-Teller (JT) transition at T_D =14 K due to the interaction between $4f$ electrons on Dy sites and the lattice. As a result, the lattice distorts from the $I4_1amd$ tetragonal to the *Imma* orthorhombic structure and ferroquadrupolar ordering occurs below T_D. We measured the dielectric constant of a single crystal of $DyVO_4$ and observed a distinct dielectric anomaly around T_D. To clarify the origin of the dielectric anomaly, we performed detailed single crystal structure analyses. Our results suggest that the JT distortion shifts the position of oxygen ions relative to a V ion and then local polarization of a VO_4 tetrahedron is induced below T_D. We also report the structural domain control causing remarkable magnetocapacitance effects by applying a relatively small magnetic field (∼0.1 T), which is attributed to the strong spin-orbit coupling of Dy $4f$ electrons.

Kazumasa Kishimoto
Osaka university

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