

## Structure of a LiKSO<sub>4</sub> single crystal studied by <sup>7</sup>Li and <sup>39</sup>K NMR at low temperature

Ae Ran Lim

*Department of Physics, Jeonju University, Jeonju 560-759, Korea*

The <sup>7</sup>Li and <sup>39</sup>K nuclear magnetic resonances in an LiKSO<sub>4</sub> single crystal grown by the slow evaporation method have been investigated using a Bruker FT NMR spectrometer. From the experimental data, the quadrupole coupling constant and asymmetry parameter were determined at room temperature and low temperature, respectively. Unlike the case at 300 K, the <sup>7</sup>Li NMR line consists of three sets at 180 K, while <sup>39</sup>K nucleus exhibits six sets for the rotation around the three crystallographic axes. The three resonance lines of <sup>7</sup>Li and <sup>39</sup>K at low temperature can be explained by the existence of three kinds of twin domains, rotated with respect to each other by 120° around the c-axis. The three resonance lines are also related to the crystallographic mirror plane. Structure of ferroelastic LiKSO<sub>4</sub> crystals at 180 K can be directly inferred from the domain pattern obtained by <sup>7</sup>Li and <sup>39</sup>K NMR. The above results show that the equations of the twin boundaries belong to the *mm2F6mm* ferroelastic species. Therefore, the symmetry of phases III and II is given by orthorhombic structure with *Cmc2<sub>1</sub>* (*mm2*) and hexagonal structure with *P6<sub>3</sub>mc* (*6mm*), respectively.