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Effects of Pressure and Electric Field on the Relaxational Dielectric Properties of K$_{0.97}$Li$_{0.03}$O$_3$ (KLT-3)\(^1\) GEORGE SAMARA, ROBERT GRUBBS, EUGENE VENTURINI, Sandia Labs, LYNN BOATNER, Oak Ridge — The temperature dependence of the dielectric response of KLT-3 shows no evidence of a thermodynamic phase transition, but reveals two prominent relaxational features associated with the off-center Li$^+$ ion, one attributed to the hopping of the Li$^+$ dipole and the other with the reorientation of Li$^+$ - Li$^+$ ion pair. Both relaxations are Debye-like and follow Arrhenius kinetics, the energy barriers decreasing with pressure. While pressure favors the relaxational behavior, a biasing dc electric field favors long-range order of the dipolar system. The interplay between pressure and field provides additional insight. Pressure suppresses the magnitude of the $\varepsilon'(T)$ response over the whole temperature range. The results allow evaluation of the contributions of the soft mode and of the Li$^+$ dipoles to the measured $\varepsilon'(T)$ response.

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