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Precursor decay anomaly in single-crystal lithium fluoride YUKIO SANO[1], TOMOKAZU SANO, Osaka University — The purpose of this study is to demonstrate that the precursor decay anomaly in single-crystal lithium fluoride (LiF) can be reduced using a macroscopic approach. To this end, a method of analyzing the evolving unsteady plane wave fronts created in the crystal upon impact is developed. The values of the parameters included in modeled strain waves in the wave fronts are determined such that the time variation of particle velocity predicted at the impact surface fits the detector current at the surface measured by Asay et al. [J. Appl. Phys. 43, 2132 (1972)]. Another condition is also used that the particle velocity-time histories at and near the surface are initially parallel. It is assumed that when the amplitude of a near-steady precursor in the predicted unsteady wave front, which increases from a static yield stress, becomes a maximum, a kink occurs at the rear of the precursor and then it begins to decay. The precursor decay curves estimated, based on this assumption, are much lower than Asay's decay curve. These lower curves are expected to reduce significantly the precursor decay anomaly in this crystal.

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