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Reshock and Release Response of Lithium Flouride to 21 GPa
R. STEWART MCWILLIAMS, Carnegie Institution of Washington, 5251 Broad Branch Rd., Washington D.C. 20015 and Howard University, 2400 Sixth Street NW, Washington D.C. 20059 — Lithium Fluoride (LiF) is a material of unparalleled utility in dynamic loading experiments due to its good transparency at high pressure and it's consequent utility as an optical window. In experiments involving reloading and release from initially compressed states, a LiF window can be essential to the measurements but its mechanical properties, such as its strength at high pressure, may complicate interpretation of the results. To address this issue, experiments studying the reshock and release response of [100]-oriented LiF have been conducted for initial shock stresses from 7 to 21 GPa. The combined reshock and release data, interpreted in the context of the self-consistent model [J. R. Asay and J. Lipkin, J. Appl. Phys. 49 (7), 4242-4247, 1978], indicate a substantial increase in the strength of LiF above 7 GPa. A quasi-elastic reloading and unloading behavior similar to other dynamically-compressed solids is observed. Sound velocities in shock compressed LiF have also been measured.

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