

Abstract Submitted
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Fast phase change dynamics as a rapid energy absorption mechanism GARETH TEAR, WILLIAM PROUD, Imperial College London — Solid-solid phase transitions in materials are well documented. Kinetics play an important role in phase transitions during shock compression due to the extremely rapid nature of the compression. This allows metastable states to be reached, whether that is a state which has been compressed beyond its stable region but has not had time to relax, or an entirely new state only possible through rapid compression. Upon release, therefore, the material may revert or transform to another state, at a different pressure and temperature to its forward transformation pressure. This leads to hysteresis, releasing or dissipating kinetic energy as heat. Controlling the loading and unloading pressure using impedance matching allows this process to be maximized. A suitable candidate material has been selected and results demonstrating the feasibility of this method to reduce the velocity of projectiles, and the amplitude of transmitted shock waves, will be presented.

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