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Features of Fourth Power Behavior of Structured Shock Waves in Selected Solids DENNIS GRADY, Applied Research Associates — Three solid materials that exhibit steady structured shock-wave fourth-power dependence of shock pressure step versus strain rate are examined in further detail. They are, respectively the compound aluminum oxide, the metal uranium and the molecular crystal HMX. For Al_2O_3 and HMX, both polycrystalline and single crystal structured wave data are examined. For both materials the plot of polycrystal and single crystal data overlay in the pressure versus strain rate plot. Further, for polycrystalline Al_2O_3 and uranium the data span of steady-wave widths exceeds the crystal grain size by one to two orders of magnitude. Structured wave data for unalloyed alpha uranium and uranium six percent niobium are compared in the pressure versus strain rate presentation. Both metals exhibit fourth-power pressure versus strain rate behavior, however, U6Nb reveals markedly reduced shock viscosity relative to alpha uranium. Underlying implications and possible sources of the experimental observations are explored.

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