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Detonation corner turning in vapor-deposited explosives using the micromushroom test ALEXANDER S. TAPPAN, COLE D. YARRINGTON, ROBERT KNEPPER, Sandia National Laboratories — Detonation corner turning describes the ability of a detonation wave to propagate into unreacted explosive that is not immediately in the path normal to the wave. The classic example of corner turning is cylindrical and involves a small diameter explosive propagating into a larger diameter explosive as described by Los Alamos' Mushroom test (e.g. (Hill, Seitz et al. 1998)), where corner turning is inferred from optical breakout of the detonation wave. We present a complimentary method to study corner turning in millimeter-scale explosives through the use of vapor deposition to prepare the slab (quasi-2D) analog of the axisymmetric mushroom test. Because the samples are in a slab configuration, optical access to the explosive is excellent and direct imaging of the detonation wave and "dead zone" that results during corner turning is possible. Results are compared for explosives that demonstrate a range of behaviors, from pentaerythritol tetranitrate (PETN), which has corner turning properties that are nearly ideal; to HNAB (hexanitroazobenzene), which has corner turning properties that reveal a substantial dead zone. Results are discussed in the context of microstructure and detonation failure thickness.

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