

Abstract Submitted
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X-ray microtomography of sugar and HMX granular beds undergoing compaction MARTIN GREENAWAY, University of Cambridge — Granular beds are an important simulant of damaged PBXs which have developed porosity. Recent developments in X-ray microtomography have provided us with the ability to resolve energetic crystals contained within a polymer matrix or granular bed. Although electron microscopy offers better spatial resolution, it yields little information beyond the surface. Methods to look inside a granular bed, PBX or energetic crystal involving polishing or optical microscopy have enjoyed only limited success. The information now available using X-ray microtomography surpasses these methods, as will be shown in this paper. Two-dimensional slices through a sample are obtained and can be reconstructed to form a three-dimensional image of the entire bed. Slices through energetic crystals reveal the presence of intragranular pores. Granular beds of sugar and HMX have been subjected to various compaction experiments; fracture, bed rearrangement, changes in porosity and other effects are clearly visible and quantifiable. The extent of bed fracture makes it possible to approximate the extent of energy dissipation due to material fracture over the different compaction regimes.

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