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Reactive decomposition of low density PMDI foam subject to shock compression[1] SCOTT ALEXANDER, WILLIAM REINHART, AARON BRUNDAGE, DAVID PETERSON, Sandia National Laboratories — Low density polymethylene diisocyanate (PMDI) foam with a density of 5.4 pounds per cubic foot (0.087 g/cc) was tested to determine the equation of state properties under shock compression over the pressure range of 0.58 - 3.4 GPa. This pressure range encompasses a region approximately 1.0-1.2 GPa within which the foam undergoes reactive decomposition resulting in significant volume expansion of approximately three times the volume prior to reaction. This volume expansion has a significant effect on the high pressure equation of state. Previous work on similar foam was conducted only up to the region where volume expansion occurs and extrapolation of that data to higher pressure results in a significant error. It is now clear that new models are required to account for the reactive decomposition of this class of foam. The results of plate impact tests will be presented and discussed including details of the unique challenges associated with shock compression of low density foams.

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