

Abstract Submitted
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Mechanical and optical response of polymethylpentene under dynamic compression¹ L. M. BARMORE, M. D. KNUDSON, Washington State University — Polymethylpentene, commonly referred to by its trade name TPX, is a thermoplastic polymer that has the potential to be a useful window material for x-ray measurements in dynamic compression experiments. An optically transparent or low x-ray absorptive window is often used to maintain stress within the sample during compression. TPX can be used as a low-impedance optical and x-ray window due to its good transmittance in most parts of the electromagnetic spectrum, very low density, and low x-ray absorption. In such experiments, laser interferometry can be used to determine the particle velocity at the interface between the sample and window. Because velocimetry measures the rate of change of the optical path length, commonly referred to as the apparent particle velocity, an experimentally determined window correction factor is needed to ascertain the actual particle velocity. Here we present the results of a series of dynamic compression experiments designed to characterize the mechanical and optical response of TPX, determine the range of stresses over which TPX is transparent, and determine the window correction factor. The index of refraction was found to be essentially linear in density, resulting in a simple constant correction factor.

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