

Abstract Submitted
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Strength of polyethylene, polypropylene and polystyrene behind a shock front CHRISTINE TYLER, NEIL BOURNE, University of Manchester, JEREMY MILLETT, AWE, Aldermaston — There is a recent interest in the response of thermoplastics to shock. Previous work on three simple polymers has indicated that the shear strength increases as the complexity of the side group increases. Shear strength measurements have been conducted using lateral stress measurements with manganin gauges that have been recalibrated for use in the low stress regime. The present work aims to investigate the effect of configuration of the thermoplastic's chain when side groups are added. In particular, whether steric effects are present when the groups become larger. Results show that whilst polyethylene has the lowest shear strength, polypropylene and polystyrene have similar values. In all cases the strength of polymer increases with time after the shock has past. As the applied stress increases, polystyrene and polypropylene strengthen to a higher degree when compared with polyethylene.

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