

Abstract Submitted
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Experimental study on shear failure of polypropylene under shock loading¹ ZHIPING TANG, TING LI, Univ. of Sci. and Tech. of China — The impact response of crystallized polypropylene under combined compression and shear loading was studied by using the inclined gas gun and the IMPS system. The experimental results show that the transverse wave velocity increases nonlinearly with the impact velocity, indicating that its shear behavior is strongly related to the hydrostatic pressure. Remarkable shear wave attenuation occurs near the impact surface when the impact velocity and inclination angle reach the critical value. The micro-observation of recovered samples with a polarized optical microscope reveals that there exists a melting layer of about 2-3 μm thick, i.e. adiabatic shear failure layer, very near the impact surface (about $5\mu\text{m}$) which causes the shear wave attenuation.

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