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Experimental study on the dynamic mechanical behaviors of polycarbonate WEI ZHANG, YUBO GAO, XUANMING CAI, NAN YE, WEI HUANG, Harbin Institute of Technology, HYPERVELOCITY IMPACT RESEARCH CENTER TEAM — Polycarbonate (PC) is a widely used engineering material in aerospace field, since it has excellent mechanical and optical property. In present study, both compress and tensile tests of PC were conducted at high strain rates by using a split Hopkinson pressure bar. The high-speed camera and 2D digital speckle correlation method (DIC) were used to analyze the dynamic deformation behavior of PC. Meanwhile, the plate impact experiment was carried out to measure the equation of state of PC in a single-stage gas gun, which consists of asymmetric impact technology, manganin gauges, PVDF, electromagnetic particle velocity gauges. The results indicate that the yield stress of PC increased with the strain rates. The strain softening occurred when the stress over yield point except the tensile tests in the strain rates of 1076s^{-1} and 1279s^{-1} . The ZWT model can describe the constitutive behaviors of PC accurately in different strain rates by contrast with the results of 2D-DIC. At last, The D-u Hugoniot curve of polycarbonate in high pressure was fitted by the least square method. And the final results showed more closely to Cater and Mash than other previous data.

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