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The Dynamic Mechanical Properties of AL-6MG Alloy with Different States MU-SEN LIN, WEI ZHANG, BAO-JUN PANG, Hypervelocity Impact Center, Harbin Institute of Technology — The mechanical behavior of Al-6Mg alloy with three treatment states (H112 state, O state and cold extrusion state) have been investigated by using INSTRON machine and SHTB. Stress-strain curves of Al-6Mg alloy with three treatment states have been obtained at quasi-static strain rates 6×10^{-4} , 6×10^{-3} and 6×10^{-2} s⁻¹ and dynamic strain rates 670~3050 s⁻¹, respectively. The results show that three materials is low sensitive to the strain rate. A mild negative strain rate sensitivity was observed at strain rates $6 \times 10^{-4} \sim 6 \times 10^{-2}$ s⁻¹ while a positive strain rate sensitivity was observed at strain rates 670~3050 s⁻¹. At quasi-static condition, three materials exhibit serrated stress-strain curves. The Al-6Mg alloy of cold extrusion state displays highest strength and Al-6Mg alloy of O state displays most ductibility, but their advantages decline with the strain rate increasing at dynamic condition. The fracture surfaces of the tested specimens have been examined. The results show that Al-6Mg alloy of O state exhibit ductile fracture at all strain rates, however, H112 and cold extrusion states display ductile fracture at quasi-static condition but fragile fracture at high strain rates.

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