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A Study of the Critical Fracture Behavior of High Purity Aluminum in the Dynamic Loading QI MEILAN, School of Science, Wuhan University of Technology, Wuhan, Hubei, P.R. China, 430070, HE HONGLIANG, Institute of Fluid Physics, CAEP, Mianyang, Sichuan, P. R. China, 621900, YAN SHILIN, School of Science, Wuhan University of Technology, Wuhan, Hubei, P.R. China, 430070, SHOCK WAVE AND DETONATION TEAM — One-dimensional strain impact experiments were performed for the High Purity Aluminum — HPA (99.999%).The measurement of free-surface velocity profile and the soft-recovery of the shocked specimen has been obtained at the same time and for the same piece of sample. The critical behavior of HPA in the dynamic tensile fracture has been discussed according to the quantitative metallographic analysis results for the shocked samples. By defining the product of the tensile stress and the time as a parameter called Tensile Impulse, the statistic results indicate that an obvious critical behavior for the damage evolution appears with the increasing of Tensile Impulse. When the Tensile Impulse is low, the damage grows slowly with a linear increment. While once the Tensile Impulse reaches a critical value, the damage grows rapidly and an increment as a power exponential function is observed. Our preliminary results indicate that the critical value of Tensile Impulse for HPA is about 0.34GPa μs. Such a critical transition behavior has shown by the macro-specimen experimentally for the first time.

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