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The Dynamic Strength of Alumina Ceramics under Impact Loading[1] YAO GUOWEN, School of Civil Engineering and Architecture, Chongqing Jiaotong University, Chongqing, China 400074, LIU ZHANFANG, Department of Engineering Mechanics, Chongqing University, Chongqing, China 400044 — There are many pores, microcracks and other defaults in polycrystalline ceramics with high singularity in stress distribution. So the hydrostatic pressure and strain rate greatly affect the inelastic deformation and dynamic strength of brittle ceramics under impact loading. In this paper, normal plate impact experiments and impact recovery experiments were performed on 92.93 wt% alumina using 100-mm-diameter compressed-gas gun. Free surface velocity histories show the HEL differs with the shock intensity. SEM analysis of recovered samples shows the transit of intergranular microcracks to transgranular microcracks with increasing impact loading. Based on the experiments, the evolution of the HEL of ceramics was discussed. It was proposed that the HEL was brought into correspondence with transition from intergranular to transgranular microcracking. Then a modified form for the HEL was proposed from the Drucker-Prager yielding criterion.

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