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Modeling the Failure Wave in Polycrystalline Ceramics under Impact Loading based on the Mesodefaults Propagation[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 — During these years, a failure wave has been observed propagating in impacted polycrystalline ceramics, such as alumina and silicon carbide. This dynamic inelastic deformation and failure process may be associated with the mesodefaults propagation and damage accumulation along crystal boundaries under impact loading. In this paper, the mesodefaults propagating model was proposed to describe the failure wave in ceramics based on their heterogeneous mesostructures. The interface force distribution in the crystal boundaries was statistically analyzed. The stress threshold for the failure wave formation was probed. Then the governing equation of the failure wave and the constitutive relation of the failed layer are proposed through the inelastic bulk strain characterized by mesodefaults propagation. Numerical simulation shows that the mesodefaults propagating model well describes the formation and propagation of the failure wave, and its interaction with the precursor and failed layer.

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