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Study on the Kinetics of γ and α Phase Transition in Ce Material

HU XIAOMIAN, PAN HAO, Institute of Applied Physics and Computational Mathematics, DAI CHENGDA, WU QIANG, Institute of Fluid Physics, China Academy of Engineering Physics — Cerium has lots of phase transition information because electron jump is easy to occur in this material. In low pressure, the phase transition and constitutive model are coupled and hard to be distinguished by single experiment. The passive confined pressure SHPB test can give the pressure-volume relation under dynamic loading and release including the phase transition character. While the plane impact experiment can give the free surface/window velocity which includes the coupled information of phase transition and constitutive model. By combinational calculation of the two experiments, taking account of the multi-phase equation of state, the phase transition and constitutive model and parameters of Cerium under dynamic loading and release can be respectively obtained. Results indicate that under loading condition the phase transition of Cerium is equilibrium. However under release it is hard to be described and non-equilibrium phase transition course is required. The change of shear modulus after the phase transition can notably influence the release process of Cerium.

Song Haifeng
Institute of Applied Physics and Computational Mathematics

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