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Phase Transition Taylor Test[1] XINGHUA ZHANG, YANGBO GUO, ZHIPING TANG, Key Laboratory for Mechanical Behavior and Design of Materials (LMBD), Department of Modern Mechanics, University of Science and Technology of China — In this article, the Taylor impact test is applied to investigate the dynamic phase transformation behavior of NiTi alloy, which we call it the phase transition Taylor test (PTTT). The symmetry impact configuration is applied in the study at impact velocity range from 47m/s to 175m/s by using a light gas gun facility in this lab. The NiTi alloy is treated in the state of shape memory effect (SME). The shape of the recovered samples is substantially different from that of traditional elastic-plastic Taylor test. The recovered NiTi bar can be divided into three deformation regions from the impact surface: the main deformation region with homogeneous deformation, the gradient deformation region and the elastic region successively, which correspond to the martensitic phase, mixed phase and austenite, respectively. The different deformation regions demonstrate the interaction between the dynamic phase boundary and the rarefaction wave reflected from the free end of the bar. Simulation with the macroscopic phase boundary propagation theory[1]is in good agreement with the experimental measurement. [1] Dai X et al, International Journal of Impact Engineering, 30(4)(2004), 385.

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