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Phase Transition Behavior and Abnormal Spall in FeMnNi alloy with Low $\alpha-\varepsilon$ Transition Stress HAIBO HU, YONGTAO CHEN, QINGZHONG LI, Institute of Fluid Physics, CAEP — Phase transition behavior of a FeMnNi alloy with low $\alpha-\varepsilon$ phase transition stress in range of 6∼7GPa and corresponding spall phenomena are studied. Two experiment set up of symmetric impact design with flyer and target of same thickness and reverse impact technique of metal flyer on sapphire window are used. Loading and release wave profile are recorded with help of VISAR with two constants of strip numbers. Experiments are conducted on 100-mm-diameter and two stage light gas gun in velocity range from 300m/s up to 2000m/s. Discussion is focused on the formation of rarefaction shock wave and role of RSW in spallation. It is shown that spallation may happen in symmetric impacts when stress is higher than phase transition point. In velocity range up to 2000m/s, when impacting stress is more than 40GPa and shock front is overdriven, a spallation like oscillation profile is noticed in domain of first plateau in velocity curve. As release wave from impact side should come some time later, it may be raised by reflection of release wave from free surface with reverse phase transition. Specimen is thoroughly broken, although pulse X-ray records at the moment of 14 μs after impact show no sign of multi-spallation. Further experiments are planned using VISAR with two constants of strip numbers to verify this phenomenon and parameters such as spall strength, spall thickness.

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