

Abstract Submitted
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Experimental Investigation of Dynamic Compression and Spallation of Cerium at Pressures up to 6 GPa¹ ALLA ZUBAREVA, SERGEY KOLESNIKOV, ALEXANDER UTKIN, Institute of Problems of Chemical Physics RAS — In this study the experiments on one-dimensional dynamic compression of Cerium (Ce) samples to pressures of 0.5 to 6 GPa through an impact of Al flyer plates accelerated with various types of explosively driven generators were conducted. VISAR laser velocimeter was used to obtain Ce free surface velocity profiles. At pressures of about 0.5 GPa the isentropic compression wave which was blurred in time was registered instead of a usual shock wave. It was due to the anomalous compressibility of γ -phase of Ce. At pressures higher than 0.78 GPa that corresponded to γ - α -transition in Ce the two-wave configuration was observed which consisted of the similar wave of isentropic compression and the following shock jump. At the profiles obtained for experiments with thin Al flyer plates a shock rarefaction wave was clearly registered in Ce samples, the appearance of which was also due to the anomalous compressibility of γ -phase. In several samples spall phenomena were also observed. The results showed a strong dependence of the spall strength of Ce on the strain rate: at its increase by an order of magnitude ($3 \cdot 10^4$ to $3 \cdot 10^5$ s⁻¹) the spall strength rose from 0.4 to 0.6 GPa. Authors would like to thank M.V. Zhernokletov for supplied samples.

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