

Microstructure study in alloys under laser induced nanosecond duration pulse

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Structural study of Titanium VT6, Vanadium VnP-1 and Zr plane targets (diameter 10 and 14 mm, thickness 0.9 mm) subject to nanosecond duration laser pulse by Beamtech SGR-Extra-10 Nd:YAG laser was conducted in comparison with VISAR velocity data of free surface. Pulse duration was 10 ns and energy 9.0 J to 10 J. Laser beam is focused onto a square spot 1x1 mm. Velocity profiles of free surface were recorded by FDVI Mark IV-3000 VISAR system and the Tektronix DPO 7254 Oscilloscope. The microhardness was measured along the target cross-section passing through the middle square impact area with the size near 1 mm. The samples were studied both in the unetched state (including for measuring microhardness) and after chemical etching. The correlation was found between microhardness distribution and damage preceding the spall area initiation.

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