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Understanding the micro-mechanics of spall initiation in titanium alloys EUAN WIELEWSKI, Cornell University, GARETH APPLEBY-THOMAS, Cranfield University, PAUL HAZELL, The University of New South Wales — Significant progress has been made in understanding the effects of microstructural and micro-textural features on the mechanical behavior of titanium alloys at low strain rates. However, very little information is available in the literature on the effects of microstructure and micro-texture on the behavior of titanium alloys at high strain rates, particularly in terms of important failure mechanisms such as spall. In this study, the micro-mechanics of spall initiation in the titanium alloy, Ti-6Al-4V, was investigated via Backscatter Electron (BE) microscopy and Electron Back-Scatter Diffraction (EBSD) analysis of a recovered specimen from a typical plate-impact experiment. The analysis shows that spall initiates due to the nucleation of voids at the grain boundaries between plastically hard/soft grains and then propagates via the highly localized coalescence of the nucleated voids.

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