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Laser Shock-Induced Spalling in Tantalum TANE REMINGTON, UCSD, CHRISTOPHER WEHRENBERG, BRIAN MADDOX, BRUCE REMINGTON, LLNL, MARC MEYERS, UCSD, LLNL UCSD TEAM — The process of dynamic failure by spalling was established in nano, poly, and mono crystalline tantalum in recovery experiments following laser compression and release. Samples were compressed over a range of pressures between 5-13 GPa. The waves were allowed to reflect at the back surface (specimen thickness ranged from 50-250 μm) and the process of separation was characterized by SEM. Spall strength was measured by the shock breakout and pull back signal using VISAR. The spall strength increases with increasing strain rate and grain size. In the nano and polycrystals, spalling occurred by ductile fracture favoring grain boundaries. In the monocrystals, the process was of ductile failure by void initiation, growth and coalescence. Work performed at the Jupiter Laser Facility (JLF), Lawrence Livermore National Laboratory (LLNL). This research is funded by the UC Research Laboratories Grant (09-LR-06-118456-MEYM) and the National Laser Users Facility (NLUF) Grant (PE-FG52-09NA-29043).

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