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High temperature dynamic response of alpha- and gamma-uranium. E. ZARETSKY, Ben Gurion University, B. HERRMANN, NRCN, D. SHVARTS, NRCN — Unalloyed uranium and uranium-based U-0.75%Ti alloy were studied in planar impact experiments with initial sample temperature ranged from 300 to 1050 K. The velocity of the samples free surface was monitored by VISAR. It was found, with aid of the simple wave approximation, that the flow stress of studied materials is composed of two parts: the strain-rate independent part which stays constant up to the onset of alpha-gamma transformation and drops almost four times in gamma-phase, and the strain-rate dependent, viscous, part. The latter is characterized by 20-fold decrease of the dynamic viscosity with heating from room to transformation temperature. This decreased viscosity is inherited unchanged by transformed gamma-phase. The spall strengths of alpha-uranium decreases slightly, about 30%, with its heating towards the transformation temperature and experiences two times drop entering the gamma-phase. The transformation causes similar drop of the uranium shear modulus while its bulk modulus undergoes only 10-% change.

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