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Dynamic yield and tensile strengths of spark plasma sintered alumina INNA GIRLITSKY, E. ZARETSKY, S. KALABUKHOV, M. DARIEL, N. FRAGE, Ben-Gurion University — Fully dense alumina samples with $0.6\text{-}\mu$ grain size were produced from alumina powder using Spark Plasma Sintering and tested in two types of VISAR-instrumented planar impact tests. . In the tests of the first type the samples of 0.28 to 6-mm thickness were loaded by 1-mm tungsten impactors accelerated up to velocity of about 1 km/s. These tests were aimed to study of the Hugoniot elastic limit (HEL) of the SPS-processed alumina and the decay of the elastic precursor wave with the propagation distance. In the second type of the tests the samples of ~ 3 -mm thickness were loaded by 1-mm copper impactors accelerated up to velocities 100-1000 m/s was. These tests were aimed to the study of the dynamic tensile (spall) strength of the alumina. The data on the decay of the elastic precursor wave allow determining the rates of the irreversible (inelastic) strains in the SPS-processed alumina at the initial stages of the shock-induced plastic deformation and, thus, to derive some conclusions concerning the mechanisms responsible of the deformation. The data on the tensile fracture of the alumina demonstrate a monotonous decline of the spall strength with the amplitude of the loading stress pulse.

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