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Features of Mechanical Behaviour of Nanostructured Ceramics under Impulse Loadings EVGENIA SKRIPNYAK, VLADIMIR SKRIPNYAK, Tomsk State University — Features of mechanical behavior of nanostructured Al_2O_3 and ZrO_2-3mol. % Y_2O_3 ceramics under dynamic loadings were investigated by multilevel computer simulation approach. It was studied model ceramics representative volumes with grain sizes from 50 up to 1000 nm and porosity from 0 to 10% under shock waves with amplitudes up to 10 GPa. Results of simulation have shown that Hugoniot elastic limit of nanostructured oxide ceramics depends not only on the porosity, but also a ratio of size of voids to size of grains and voids distribution on the mesolevel. At identical porosity, concentration of nanovoids near grain boundaries causes the decreasing of the shear strength of nanostructured and ultrafine-grained ceramics. It is revealed, the occurrence of bimodal distributions of the local particle velocity on mesolevel precedes the nucleation of microcracks.

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