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Modeling the mechanical behavior of ceramic and heterophase structures manufactured using selective laser sintering and spark plasma sintering VLADIMIR A. SKRIPNYAK, EVGENIYA G. SKRIPNYAK, VLADIMIR V. SKRIPNYAK, IRINA K. VAGANOVA, National Research Tomsk State University — A model for predicting mechanical properties of ultra-high temperature ceramics and composites manufactured by selective laser sintering (SLS) and spark plasma sintering (SPS) under shock loading is presented. The model takes into account the porous structure, the specific volume and average sizes of phases, and the temperature of sintering. Residual stresses in ceramic composites reinforced with particles of refractory borides, carbides and nitrides after SLS or SPS were calculated. It is shown that the spall strength of diboride-zirconium matrix composites can be increased by the decreasing of porosity and the introduction of inclusions of specially selected refractory strengthening phases.

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