Structure Transformation upon Hot Deformation of SHS-Produced Off-Stoichiometric Titanium Carbide

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We investigated the evolution in the microstructure of off-stoichiometric titanium carbide ($\text{TiC}_{0.47}$) in the case of: (1) rapid hot deformation at a low strain $\varepsilon$ (shock compression) and (2) slow deformation to high $\varepsilon$ (superplastic deformation). Hot deformation of $\text{TiC}_{0.47}$ was found to give rise to two parallel processes: dynamic recrystallization and phase transformation. These processes led to refining the material structure and to a change in the chemical composition of carbide grains. The process of dynamic recrystallization can be utilized to prepare graded and fine-grained ceramic composites.