

Intertwined Processes of Coarsening, Densification, and Grain Growth during Sintering of Nanosized Particles

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Sintering is one of the main and few approaches for building bulk ultrafine-grain materials from the bottom up. One of the main challenges in sintering nanosized powders is controlling grain growth while achieving full densification. Considerable literature is now available for identifying unique mechanisms that could provide clues to achieving densification with minimal grain growth. It is critical to understand the detailed mechanistic steps to design processes that can lead to bulk materials with maximum density and minimum grain size. Using experimental data of sintering nanosized tungsten carbide and tungsten powders, this presentation examines the intertwined processes of neck growth, coarsening, densification, and grain growth. When the density of the compact of nanosized particles is very low, coarsening of particles is responsible for most of the observed initial grain growth. Coarsening also contributes to densification. Because initial coarsening depends on surface diffusion, surface diffusion indirectly also contributes to densification.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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