

The Fundamentals of Grain Growth in Sintering

Sunday, 30 August 2026 14:00 (3 hours)

Understanding grain growth and microstructural evolution is essential for controlling the properties of sintered materials. This lecture presents an overview of the mechanisms governing grain coarsening in both liquid-phase and solid-state sintering. It begins by examining the implications of grain growth for densification, with emphasis on capillarity and related driving forces.

Grain growth in liquid-phase sintering is reviewed through classical and contemporary models, including Ostwald ripening theory and the mixed-mechanism theory that describes coarsening behavior in liquid matrices. The lecture then addresses grain-growth phenomena in solid-state sintering, covering dense single-phase systems as well as the effects of second-phase particles, solute segregation, and residual porosity on boundary migration and grain growth. Within the framework of unified growth descriptions, the mixed-control mechanism of boundary migration and the mixed-mechanism principle of microstructural evolution are discussed, supported by experimental results from both ceramic and metallic systems. The lecture concludes by summarizing strategies for microstructural design in ceramics and powder-processed materials, and by outlining current challenges and emerging research directions.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

Author: KANG, Suk-Joong (Korea Advanced Institute of Science and Technology)

Presenter: KANG, Suk-Joong (Korea Advanced Institute of Science and Technology)

Session Classification: Tutorial

Track Classification: Group 1: Fundamental aspects of sintering