TEL AVIV UNIVERSITY אוניברסיטת תל אביב

You are cordially invited to attend
The Seidman Family Lecture Series
In memory of Elie and Jeanne Cohen-Sabban, z"l, Marseille, France, and Charles and Jeanette Seidman, z"l, New York City, New York

Grain Growth Phenomena: From the Nanoscale to the Microscale

Prof. Enrique Lavernia

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This lecture reviews generalized grain growth phenomena, paying particular attention to results obtained with nanostructured metals. Results related to the influence of deformation rate on grain mosphology and dislocation substructures are presented and discussed. The influence of fatigue deformation is described as the structure evolves from one size regime to the other. Finally, we report on a study of stress-induced grain growth phenomena in the presence of second-phase particles and solute/impurity segregation at grain boundaries (GBs) during high-temperature deformation of ultra-fine grained (UFG) materials. Results are analyzed for an Al alloy synthesized via consolidation of mechanically milled powders. The mechanisms underlying stress-induced grain growth were identified as GB migration and grain rotation, which were accompanied by dynamic recovery and geometric dynamic recrystallization, while discontinuous dynamic recrystallization was not operative. A theoretical framework that incorporates the effect of second-phase particles and solute/impurity segregation at GBs on stress-induced grain growth is formulated and discussed. The experimentally determined stress-induced grain growth results are rationalized using the proposed theoretical framework.

Furthermore, the effect of second-phase particles and solute/impurity segregation at GBs on GB migration and grain rotation was quantified using the model, indicating that both second-phase particles and solutes/impurities segregated GBs reduce the velocities of GB migration and grain rotation as compared to those in commercially pure Al.

Enrique J. Lavernia is provost and executive vice chancellor of UC Irvine, effective July 1, 2015. Lavernia is former dean of the UC Davis College of Engineering, and member of the National Academy of Engineering.

Lavernia has published more than 500 journal and 200 conference publications on topics ranging from nano-materials to aluminum alloys. His research interests include the synthesis and behavior of nanostructured and multi-scale materials with particular emphasis on processing fundamentals and physical behavior; thermal spray processing of nanostructured materials; spray atomization and deposition of structural materials; high temperature-high pressure atomization processes; and mathematical modeling of advanced materials and processes.

Lavernia earned a B.S. in Solid Mechanics from Brown University in 1982; an M.S. in Metallurgy in 1984; and a Ph.D. in Materials Engineering in 1986, both from the Massachusetts Institute of Technology.

Wednesday, November 2nd, 16:00
Room 206, Wolfson Mechanical Engineering Building