東京大学大学院工学系研究科　総合研究機構

結晶界面工学研究室
Crystal Interface laboratory

Crystal Interface Lab. Seminar Series

Institute of Engineering Innovation
The University of Tokyo

“Dislocation Accommodated Deformation in Mullite and Superplastic Multiphase Ceramics”

Prof. Martha L. Mecartney

Department of Chemical Engineering and Materials Science,
University of California, Irvine
Irvine, CA 92617 USA

Abstract

Deformation of superplastic ceramics containing multiple phases requires grain boundary sliding at interfaces between dissimilar materials. Studies have shown that the rate of grain boundary sliding is similar at all different types of interfaces for a model three-phase material of alumina-zirconia-mullite. Accommodation processes that prevent cavitation during superplastic deformation include dislocation generation and transit across grains. This talk will highlight work on dislocation emission from grain boundaries in multiphase materials that are deformed under high temperature compression and will discuss theoretical models that are compatible with the experimental evidence obtained by transmission electron microscopy. One unexpected observation was the documentation of dislocation assisted deformation in the mullite phase, especially noteworthy since prior research on single crystal mullite had shown no plastic deformation even at high temperature and high loads. This talk will conclude with the results of our subsequent experiments to characterize the nature of slip in polycrystalline mullite and explain the contrary previous results on single crystal mullite.

July 10 (Wed), 2013 15:00 -16:30

Main meeting room at Institute of Engineering Innovation, UT

(工学部総合研究機構　9号館１階　大会議室)

Organizer: Prof. Yuichi Ikuhara