

T_cSAM Bi-Weekly Brown Bag Seminar

Texas Center for Superconductivity and Advanced Materials

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University of Houston



“Interface and Processing Effects on Oxide Thin Film Epitaxy”

Friday, November 21, 2003

Room 102, University of Houston

Houston Science Center

12:00 p.m. – 1:00 p.m.

Abstract

Understanding the epitaxial mechanisms, interface structures, and processing condition effects has become a technically important issue in oxide thin film epitaxy and device fabrication. We have systematically investigated the effects from strains, substrate surface step terraces, misfit dislocations, and processing partial pressures and temperatures on the epitaxial behavior and physical properties of various as-grown ferroelectric (Ba,Sr)TiO₃, ferromagnetic (La,Ca)MnO₃, and highly ionic conductive oxide Gd:CeO₂ thin films. Many interesting phenomena have been observed in these systems. For instance, misfit edge dislocation spacings in the ferroelectric Ba_{0.6}Sr_{0.4}TiO₃ thin films on (001) LaAlO₃ can be adjusted by processing oxygen partial pressures. Strain energy in the highly ionic conductive Gd:CeO₂ thin films on (001) LaAlO₃ can be released by unique directionally aligned nanoparticles. Models of the surface-step-terrace that induce the formations of conservative and non-conservative nano domain boundary structures have been developed to understand the microstructure-property relationships. Details will be presented in the talk.

Brief Bio

Dr. C. L. Chen is currently a research associate professor and the task leader of oxide thin film epitaxy at TcSAM. He received his Ph. D. degree in solid state science from the Pennsylvania State University in 1994. He was the Director's Funded Post-doctoral Fellow in the Los Alamos National Laboratory before he became a research assistant professor at TcSUH in June 1996. His research interests have spanned over the areas of oxide thin film epitaxy and nanostructure fabrication, surface physics and chemistry, and modeling developments. He has authored and/or coauthored more than eighty refereed papers that have appeared in *Nature*, *Physical Review Letters*, *Applied Physics Letters*, and others, and has delivered more than 60 invited talks/lectures at international/national conferences (MRS, ACerS, IMRUS, etc.) and universities.

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