

T_CSUH Bi-Weekly Seminar

Texas Center for Superconductivity at the University of Houston

Dr. Jim Meen

Research Associate Professor
Department of Chemistry and T_CSUH
University of Houston



Electron Beam Characterization of YBa₂Cu₃O_{7-δ}

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Room 102, University of Houston Science Center
12:00 Noon – 1:00 p.m.

Abstract

There are significant challenges to characterizing YBa₂Cu₃O_{7-δ} (Y123) by electron microbeam but the results obtained have considerable utility. Few samples of Y123 have that cation stoichiometry. Variations within individual monoliths are used to map crystallization sequence and it will be shown that this is not necessarily from a single nucleus. Melting relations under different partial pressures of oxygen are employed to show that copper is in mixed valence state in Y-Ba-Cu oxide liquids even in pure oxygen and this has its own influence on the phase relations and in crystallization of Y123. Determination of oxygen content of Y123 is critical in its characterization but is altered by procedures used to prepare samples for analysis and by aging of the samples. The Cu L self-absorption spectrum of Y123 shows marked changes with oxygen doping and varies within some samples on a micron-scale.

Bio

Dr. Jim Meen has been a Research Associate Professor since 1995 and the Project Leader of the Materials Characterization Facility since 2002 at T_CSUH. Previously he was a Research Assistant Professor, T_CSUH (1990)-1995); a Visiting Assistant Professor, University of North Carolina, Chapel Hill (1986-1990); and a Post-doctoral Fellow, Pennsylvania State University (1985-1986); He received his B. A. in Mineralogy and Petrology, Cambridge University, U.K. (1978); his M.Sc. in Geochemistry, Oxford University, U.K. (1979); and his Ph.D. in Geochemistry and Mineralogy, Pennsylvania State University (1985).

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