# $T_c$SAM Bi-Weekly Brown Bag Seminar

Texas Center for Superconductivity and Advanced Materials


## Dr. Jim Meen

**Research Associate Professor**
**Materials Characterization Facility**


## "Oxygen Ion Conductivity and Electronic Conductivity in the Bi-Ru-Alkaline Earth Oxides"

## Friday, March 26, 2004

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

## Abstract


Bismuth-alkaline earth oxides include a rhombohedral solid solution that is a very good oxygen ion conductor perpendicular to the c-axis at relatively low temperatures (≈1 S $cm^{-1}$ at 600-700°C). There is complete mutual on-site solubility between Ba, Sr, and Ca. The Bi content ranges from <10 to 30 cation %. The conductivity mechanism, the variation of conductivity and other properties of the oxide with temperature, and the phase relations of this phase will be discussed.

The rhombohedral oxide dissolves many materials potentially used as electrodes. We have synthesized a new rhombohedral oxide saturated in Ru. It has the same oxide conductivity as the Ru-free phase. Phase relations in the Bi-Ru-Sr-Ba-O system will be discussed. The rhombohedral phase is in equilibrium with an alkaline earth ruthenate (not ruthenium oxide) under oxidizing conditions. Alternative electrode materials include Bi-Ru pyrochlores.


## Brief Bio

Dr. Jim Meen has been a Research Associate Professor since 1995 and the Task Leader of the Materials Characterization Facility since 2002 at $T_c$SAM. Previously he was a Research Assistant Professor, $T_c$SUH (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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