

# SFB 608

## Einladung zum Kolloquium

**Ort:** Universität zu Köln  
II. Physikalisches Institut, Seminarraum 201

**Zeit:** **03. Mai 2006 um 14:30 Uhr**

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**Thema:** The First 1:2 Ordered Perovskite Ruthenates

Perovskite-like mixed metal ruthenates are of interest owing to their varied electronic and magnetic properties which are heavily dependent on the ordering of the transition metals. This seminar addresses the synthesis and structural characterization of  $\text{Sr}_3\text{CaRu}_2\text{O}_9$  ( ambient pressure ) and  $\text{Ba}_3\text{CaRu}_2\text{O}_9$  ( high pressure ). Their structures are characterized by a 1:2 ordering of  $\text{Ca}^{2+}$  and  $\text{Ru}^{5+}$  over the six-coordinate B-sites of the perovskite lattice similar to the well known dielectric  $\text{Ba}_3\text{ZnTa}_2\text{O}_9$  (BZT).  $\text{Sr}_3\text{CaRu}_2\text{O}_9$  was the first example of this structure-type to include a majority metal with  $d$  electrons ( $\text{Ru(V)}$ ,  $d^3$ ). The bond length mismatch between Ca-O and Ru-O leads to significant tilting, twisting and deformation of the metal-oxygen octahedral. The relationship of this material to the  $n = 1$  Ruddlesden-Popper type  $\text{Sr}_{1.5}\text{Ca}_{0.5}\text{RuO}_4$  (*i.e.*,  $\text{Sr}_3\text{CaRu}_2\text{O}_8$ ) highlights the dramatic effects of the ruthenium valence on the resultant structure. Remarkably, each of these structures can be quantitatively converted to the other by the appropriate choice of reaction temperature and atmosphere.

Gez. Prof. G. Meyer