intercalated $Na_{1-x}CoO_{2-x}$, spin-state transitions of the Co^{3+} ion in $LaCoO_3$, a metal-insulator (MI) accompanied by structural transition in $LnBaCo_2O_{5.5}$ (where Ln is a rare earth). We present our recent results on crystal growth of cobaltites: $La_{1-x}Sr_xCoO_3$ and $LnBaCo_2O_{5+x}$ using Optical Travelling Solvent Floating Zone method. The crystals were studied by different techniques and some of results will be discussed. A very small Sr doping level (0.2%) drastically changes magnetic properties of La1-xSrxCoO_3 as found using inelastic neutron scattering and magnetisation measurements. This can be explained assuming that the slight hole doping in $LaCoO_3$ matrix creates magnetic polarons, which leads to a spin-state transition of Co^{3+}. On the background of the spin-state and orbital-ordering transitions of the Co^{3+} ion in $LnBaCo_2O_{5+x}$, the system shows a metal-insulator transition accompanied by structural one at temperatures above room temperature, three different magnetic phases below room temperature and a structural transition at temperature above MI transition. All these properties can be tuned by a kind of the rare earth ion and oxygen stoichiometry. Structural, magnetic and transport studies of layered cobaltites $LnBaCo_2O_{5.5}$ (Ln=Tb, Nd) especially near metal-insulator transition will be presented.

Keywords: crystal growth, crystal structure and properties, transition metal-rare earth oxides

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Micro-crystallographic structure of Sr_2RuO_4/$Sr_3Ru_2O_7$ eutectic crystals grown by floating zone method

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Directional solidification at high temperature gradients by Infrared Image Furnace of Sr_2RuO_4/$Sr_3Ru_2O_7$ eutectic crystals has shown that mainly two distinct eutectic morphologies occur, a regular lamellar structure and a wavy lamellar structure. High resolution X-ray analysis has shown that the two phases are stacked in a multilayer structure along their c-axis. The analysis of X-ray diffraction patterns by the Rietveld method has been used to determine the percentage of each phase in crystals grown starting from a different composition of the polycrystalline rod. The morphology of crystals with different fraction of Sr_2RuO_4 and $Sr_3Ru_2O_7$ phase has been investigated by optical and electron microscopy. Electron back scatter diffraction (EBSD) technique was used to characterize the crystallographic match at the interface between Sr_2RuO_4 and $Sr_3Ru_2O_7$ phases. In particular the crystallographic match has been investigated for interfaces along plane parallel and perpendicular to the growth direction. Moreover, the misorientations for sharp and wavy lamellar structure have been thoroughly investigated with EBSD technique.

Keywords: eutectic crystallization, float zone growth, back-reflection electron Kikuchi pattern

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Chirality realized only in the crystalline state: Inorganic and organic compounds

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Some compounds exhibit chirality only in the solid state through chiral supramolecular arrangement of achiral compounds or through trapping a chiral conformation of a flexible achiral compound. The chirality must be measured in the solid state, however, the macroscopic anisotropies of crystals, Linear Birefringence (LB) and Linear Dichroism (LD) cause parasitic artifact signals in CD (Circular Dichroism). Thus, we have designed and built a Universal Chiroptical Spectrophotometer (UCS-1[1], UCS-2[2]) and devised a set of procedures for obtaining artifact-free CD and CB (circular birefringence) based on the Mueller matrix method. We have studied inorganic crystals, α-$Ni(H_2O)_6\cdot SO_4$ and $Ni(H_2O)_6\cdot SeO_4$, which exhibit natural optical rotatory power only in the crystalline state. Using UCS-1, we could show that true CD and CB signals satisfy the Kramers-Kronig relationship.[3] Further we have discovered a remarkable sign inversion of single crystal CD in one of the Ni *d-d* transitions at near liquid nitrogen temperatures, although the crystal structure hardly changes.[4] With UCS, we have also observed birefringence of a chiral cubic crystal of class T, $NaClO_3$ and $NaBrO_3$, along the [100] directions for the first time and proved that the anisotropy is of an intrinsic nature. Only the non-birefringent axis is along the [111] directions.[5] Photocyclization of dynamically achiral organic compounds also produces enantioselective reaction products if carried out in chiral crystal environment.[6]

1) R. Kuroda, T. Harada, Y. Shindo, *Rev. Sci. Instrum*. **72**, 3802-3810 (2001)
2) T. Harada, H. Hyakawa and R. Kuroda, *Rev. Sci. Instrum*. **79**, 0731033802(2008).
3) T. Harada, Y. Shindo and R. Kuroda, *Chem. Phys. Lett*., **360**, 217-222 (2002).
4) T. Harada, T. Sato and R. Kuroda, *Chem. Phys. Lett*., 456, 268-271 (2008)
5) T. Harada, T. Sato and R. Kuroda, *Chem. Phys. Lett*., **413**, 445-449 (2005).
6) R. Sekiya, T. Sato, T. Harada and R. Kuroda, to be submitted.

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Structure-property relationship in the crystals of chiral amino acids and their racemic counterparts

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Understanding structure-property relations in crystalline amino