

講演会の御案内

- 日時: 平成24年1月20日(金) 13:20~14:50
- 場所: J2棟3階 J233
- 講師: Alexei A. Belik (物質・材料研究機構(NIMS)・主任研究員)
- 演題: 「High-pressure synthesis of ferroelectric and multiferroic materials」

In our talk, we will present results on the high-pressure synthesis and properties of Bi-based perovskites. Simple BiMO_3 compounds and solid solutions $\text{BiM}_{1-x}\text{M}_2\text{O}_3$ will be discussed. In some solid solutions, the existence of a *Cm* phase was found in a wide compositional range. The *Cm* phase exists in solid solutions of $\text{PbTi}_x\text{Zr}_{1-x}\text{O}_3$ at a very narrow compositional range of $x = 0.55$ and is believed to be at the origin of excellent piezoelectric properties of this composition.

We will also discuss a new class of multiferroic materials: In-based perovskites. We showed that $\text{In}_{1-x}\text{M}_x\text{MO}_3$ with $x = 0.1120-176$ and $M = \text{Fe}_{0.5}\text{Mn}_{0.5}$ adopts the LiNbO_3 structure and high Curie temperature; $\text{In}_{1-x}\text{M}_x\text{MO}_3$ is a canted antiferromagnet with the Néel temperature close to RT. $\text{In}_{1-x}\text{M}_x\text{MO}_3$ presents a new class of perovskite materials (with In^{3+} in the A site of a perovskite ABO_3) that is almost completely unexplored. This class of materials is unique because (1) long-range magnetic ordering survives near RT despite of significant disordering in the A and B sites, (2) the same transition metals are located in both A and B sites, and (3) a polar distortion is realized without presence of ions with the lone electron pair. Our results give a significant contribution to the development of RT multiferroics and open wide possibilities for thin-film research and future improvement of In-based perovskites. Our results also show new ways for the preparation of perovskite-type materials.

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