

The collaboration research for the Dual Graduate School between VNU and JAIST

[Title of collaboration research]:

Study on insulator-metal transition and magnetic properties of perovskite compounds

[The members of collaboration research]:

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[Reference home-page address]:

[Other references]:

<http://www.jaist.ac.jp/~kkgi/thisyear/soe/00105soe.html>

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Purpose:

We aim to study insulator-metal transition and magnetic properties of perovskite compounds by means of pressure effect on their transport and magnetic properties of bulk samples. Recently, much attention has been attracted in doped manganese perovskites due to the discovery of colossal magnetoresistance (CMR effect) as well as interesting thermoelectric properties of them. The interatomic distances, the bond angles and the charge carrier concentration are the key parameters to define an electronic band structure of the compounds. The substitution of A-site cation with different elements or applying external pressure may tune the electronic states of the compounds appreciably. The metallic, ferro- and antiferromagnetic ordering, paramagnetic state and charge ordered structures can be tuned.

Experiments:

1. Preparation of the samples.
2. Investigating crystal structure of the samples by using XRD technique.
3. Determining the lattice constants of the sintered ingot samples by the Rietveld analysis.
4. Measuring magnetic properties in detail by a SQUID magnetometer.
5. Measuring metal-insulator transition and magnetic phase transition characteristic.
6. Measuring thermoelectric properties.

Prospective effects of work:

Learning preparation methods of bulk samples and structural examination of the ingots should be a good experience to a newcomer in this solid state physics. The use of advanced machines such as a SQUID magnetometer, equipments for the measurement of thermoelectric properties of solids, ... will be a useful experience during the study of a current topic in highly correlated electron system of perovskite materials.