SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **środę**

17 czerwca 2015 r., o godz. 10:00

w sali 203 (bud. 1) odbędzie się seminarium, na którym

Prof. dr Bogdan Dąbrowski

Department of Physics, Northern Illinois University, DeKalb, IL, USA

wygłosi referat na temat:

"Search for Displacive-type Multiferroics with a Large Magnetoelectric Coupling"

It has been recently proposed that it should be possible to introduce ferromagnetism and ferroelectricity in $Sr^{2+}Mn^{4+}O_3$ and derivative materials when tensile strains up to 4.9% are achieved. We have been working with similar manganites for two decades and projected earlier that similar to the d^0 titanates strain effects should be observed in the non-d^0 perovskites resulting in a strong ferroelectric-magnetic coupling of the same magnetic ion. However, until only recently, it was proven challenging to achieve the displacive ferroelectric distortion in the d^3 manganites because the [Mn^{4+}-O] bonds have not been put under sufficient tension. By advancing elaborate synthesis processes, which are necessary to avoid the more stable hexagonal polymorphs, we were recently able to extended the substitution limit of the large size Ba ion in bulk $Sr_{1-x}Ba_xMnO_3$ samples to $x = 0.45$ with two-step "*in situ*" synthesis in a thermogravimetric furnace in flowing H_2/Ar gas followed by oxygen anneal. The achieved perovskite ceramics exhibit classical displacive-type ferroelectricity ($T_F > 300$ K) and G-type antiferromagnetism ($T_N \sim 200$ K) originating exclusively from the Mn cations. The largest known magneto-electric coupling was observed near T_N when ferroelectricity disappears. Our more recent efforts focus on Ti-substituted $Sr_{1-x}Ba_xMnO_3$ materials since they show enhanced spontaneous polarizations at higher temperatures and a tunable suppression of displacive ferroelectric distortion by magnetic transition. I will describe our study of the $(Sr,Ba)(Mn,Ti)O_3$ phase diagram in search of displacive-type multiferroic perovskites and hexagonal materials as well as improper hexagonal multiferroics.

Serdecznie zapraszamy

Roman Puźniak
Henryk Szymczak
Andrzej Wiśniewski