SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w **ŚRODĘ**

30 maja 2012 r., o godz. 10:00

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

Prof. Bogdan Dabrowski

Northern Illinois University, DeKalb, IL, USA

wygłosi referat na temat:

„Search and discovery of strongly coupled multi-ferroic perovskites $Sr_{1-x}Ba_xMnO_3$"

Search for multi-ferroic materials, where magnetism and ferroelectricity are strongly coupled, is of fundamental technological and theoretical importance. Weak coupling between post-transition metal's ferroelectricity of *s/p*-electrons and magnetism of transition metals *d*-electrons is known above room temperature (for example for $Bi^{3+}Fe^{3+}O_3$). Improper ferroelectrics, where the same *d*-electrons are responsible for both ferroelectricity and magnetism are also known (for example, $HoMnO_3$) but their spontaneous polarizations are small and appear at low temperatures. We have applied our "tolerance factor synthesis-properties design rules" to devise and obtain unique strongly coupled multi-ferroic $Sr^{2+}_{1-x}Ba^{2+}_xMn^{4+}O_3$ perovskites for which ferroelectricity (T_F ~ 400 K) and G-type antiferromagnetism (T_N ~ 200 K) originate exclusively from the Mn d^3-electrons. Similar to $Ba^{2+}Ti^{4+}O_3$, the classical ferroelectric effect occurs in $Sr_{1-x}Ba_xMnO_3$ (x>0.4) when the Mn ions move out of the center of the MnO_6 octahedral units. This shift is a result of the deliberately introduced enormous tension exerted on the Mn-O bonds by means of chemical substitution of the large Ba ions. Because of the presence of the magnetic Mn d^3-electrons, as opposed to d^0 electronic configuration of Ti, these materials exhibit the largest known magneto-electric coupling at T_N. I will describe structural, magnetic and ferroelectric properties of these materials and explain demanding synthesis conditions necessary to make them. Similar paths to obtain ferromagnetic manganites with elongated Mn-O bonds will be discussed.

Serdecznie zapraszamy

Roman Puźniak
Henryk Szymczak
Andrzej Wiśniewski