

Study of Functional Perovskite Structural Materials Using X-ray Diffraction

Xue-Qi Fu (傅學麒)^{1*}, Bruna de Moraes Melo Haung(黃露娜)¹, Yu-Hui Liang (梁喻惠)¹, Chun-Hao Lai (賴君豪)¹, Wan-Ting Chen (陳婉婷)¹, Du, Chao-Hung (杜昭宏)¹

¹Department of Physics, Tamkang University, New Taipei City, Taiwan

asd555121@gmail.com

Abstract

Multiferroics are materials that exhibit simultaneously any two, or more than two, ferroic properties, such as ferroelectricity, ferroelasticity, ferromagnetism (antiferromagnetism), etc. It is important to note that though several double perovskites of the type $R_2BB'O_6$ with multiferroic properties are known, observation of a ferroelectric hysteresis loop of this clarity has been rarely reported in these double perovskites. Pr_2FeCrO_6 is a clear ferroelectric hysteresis loop at room temperature establishing its ferroelectric nature. For the purpose of understanding the property of the atomic and electrical structure phase transition, prepare the sample with the modified solid-state reaction method using the high-resolution X-ray powder diffraction on beamline TPS09A. Also, we focus the double perovskite oxides $YBaMn_2O_{5+\delta}$ and $YBaMn_{2-x}(Fe/Zn)_xO_{5+\delta}$ with special behavior of the magnetic structure. Both parent oxides $YBaMn_2O_5$ and $YBaMn_{2-x}(Fe/Zn)_xO_{5+\delta}$ possess a double perovskite structure in which the Mn and Fe/Zn atoms sit at the B-site of the octahedral cage, and the complex electronic structures, including the charge and spin ordering, and lattice distortion. In addition, in order to know about the complicated magnetic transition using the susceptibility measurements.

Keywords - double perovskite, susceptibility, multiferroics