Cationic substitution vs. multiferroics properties in metastable perovskites

E. Gilioli[1], D. Delmonte[1], A. Gauzzi[2], F. Mezzadri[1], M. Verseils[3]

[1]CNR-IMEM, Institute of Materials for Electronic and Magnetism, Area delle Scienze 37/A, 43124, Parma, Italy
[2]IMPMC, Sorbonne Université-CNRS-IRD-MNHN, 4, place Jussieu, 75005 Paris, France
[3]Synchrotron SOLEIL, L'Orme des Merisiers, 91190 Saint-Aubin, France
e-mail: edmondo.gilioli@cnr.it

Multiferroic materials, beside the fascinating fundamental research, are gaining increasingly interest for their potential applications in many fields, whenever the electrical/magnetic properties can be mutually controlled. Unfortunately, these compounds are extremely rare in nature and the coupling (between magnetism and ferroelectricity in the most wanted case) is still too weak for practical use.

The synthesis under high pressure/high temperature (HP/HT) is a powerful tool in the search for new multiferroics and the perovskite structure is a model system, for its ability to accommodate the pressure-induced distortions in different ways [1].

A selection of bulk manganites with perovskite-based compounds synthesized by HP/HT techniques at IMEM-CNR will be presented. In particular, the surprising role of the cationic substitution in the quadruple perovskite *A*Mn7O12 (*A*= Na, Ca, Bi, La, Y) in inducing and affecting the magneto-electric coupling, will be discussed.

[1] E. Gilioli and L. Ehm, IUCrJ 1 (6), 590-603 (2014).