[*C.11.* M. Giot] Magnetic structure of the charge ordered $Bi_xCa_{1-x}MnO_3$ manganites.

Within the thesis of M. Giot [1], crystals and polycrystalline sample where synthesized to study the magnetic and nuclear structure of the charge ordered $Bi_xCa_{1-x}MnO_3$ $0.5 \leq x \leq 0.64$ manganites. The "Zener polaron ordering" model based on the $P2_1nm$ space group and the "classical Mn^{3+}/Mn^{4+} ordering" model based on $P2_1/m$ space group were refined from single crystal X-Ray diffraction [2]. For the three crystals (x = 0.55, 0.60, 0.64) the $P2_1nm$ space group allowed the best fitting. A common model for the charge ordered structure (Fig. a) was proposed: the two Mn site have a valence equal to 3.5 and the structure consists on the alternation of double ribbons of $Mn(1)O_6$ and $Mn(2)O_6$ octahedra. The HREM images where well simulated with this model (Fig. b). The evolution of the anti-ferromagnetic structure with the Bi/Ca ratio study was performed on the powder diffractometer G4.1 at LLB. The data can be refined with different physical models, in particular the classical CE-type model is one of the solutions for $Bi_xCa_{1-x}MnO_3$ manganites with x = 0.5 (Fig. c). The moments tend to establish a ferromagnetic coupling with increasing x (Fig. d).

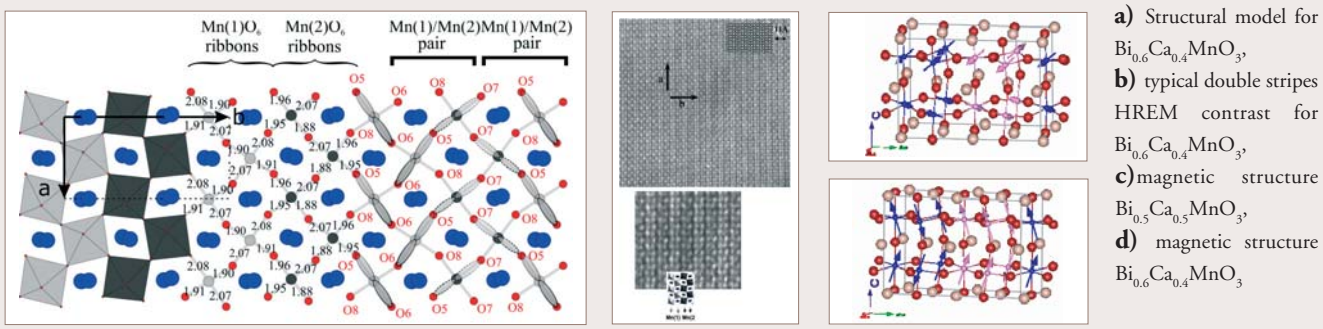
[1] « Etudes structurales et magnétiques de manganites $BixCa_{1-x}MnO_3$ présentant des mises en ordre complexes »

co-financed by CEA and Region BASSE/NORMANDIE : performed between LLB CEA Saclay and CRISMAT Caen.

[2] M. Giot et al Chem. Mat. 18 (14): 3225-3236 (2006).

[Collaborations : LLB, CRISMAT-Caen, M. Nevriva and K. Knize-Czech Republic, P. Roussel-Lille]

a) **b)** **c) et d)**



a) Structural model for $Bi_{0.6}Ca_{0.4}MnO_3$, **b)** typical double stripes HREM contrast for $Bi_{0.6}Ca_{0.4}MnO_3$, **c)** magnetic structure $Bi_{0.5}Ca_{0.5}MnO_3$, **d)** magnetic structure $Bi_{0.6}Ca_{0.4}MnO_3$

[*C12.* D. Bazin] Structural study of pathological calcification : the case of kidney stones

Urolithiasis constitutes a serious health problem that affects 3 to 20% of the population. Calculi may be composed of various inorganic and/or organic compounds. Ca oxalate (70% of the cases), Ca and Mg phosphates (15%) and uric acid (10%) are the main common components. A site of initial crystallization has been described in the 1930's by Randall. Due to their contribution to the pathogenesis of calcium urinary stones, Randall's plaques (fig. 1) have been the subject of numerous researches. The aim of this study was to determine the structural characteristics of kidney stones which have similar chemical formula i.e. the carbonate apatite. Powder Neutron Diffraction (P.N.D.) indicates that apatite cristallites contain a very small number of units cells in which Ca and phosphate groups have the spatial arrangment of apatite (fig. 2). Moreover, a significant anisotropy in the morphology of these entities is observed. Then, these "nanobiocrystals" may constitute needles-like and finally spherical objects as observed by Scanning Electronic Microscopy (S.E.M.) (fig. 3). The complete set of data give thus major structural information on these biological entities which lead to an understanding of the first steps of the genesis of the Randall's plaques.

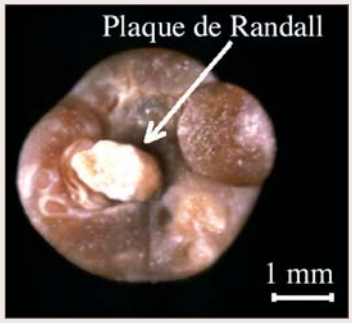


Figure 1. "Giant" Randall's plaque

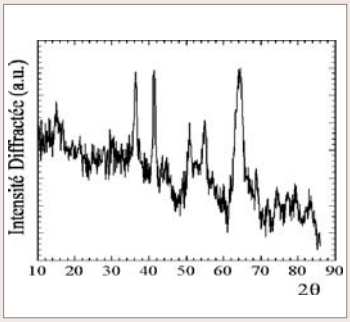


Figure 2. P.N.D. of an urinary ston

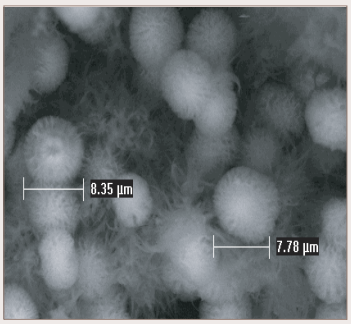


Figure 3. S.E.M. micrograph of an urinary stone

D. Bazin et al. Ann Biol Clin 2006 ; 64 (2) : 125-39. [Collaboration M. Daudon (AP-HP, Necker), D. Bazin (LPS), A. Mazouyes (Ecole Centrale Paris, LPS), P.A. Albouy, A. Thiaville, S. Rouzière, O. Stephan, A. Glotter (LPS), G. André, A. Cousson (LLB), E. Foy, P. Chevalier (Lab. P. Sue), G. Matzen, E. Veron (CRMHT), E. Elkaim, D. Thiaudiere (Soleil)].