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Postdoctoral Scientist opportunity

Solid State Chemistry - CRISMAT Lab. – Caen (France)

Crystallography and Raman spectroscopy for the characterizations of low dimensional mixed anion iron oxides (CrisRam Project)

The properties of materials are determined by the interatomic chemical bonding but also by their dimensionality. It is then of interest to combine effort to control both aspects: chemical and dimensional. The aim of this experimental project is the study of the reduction of dimensionality depending on anion makeup in iron intergrowths. Recently, it has been shown that it is possible to stabilize intergrowths between oxygen deficient perovskite ($\text{SrFeO}_{2.5}$), rock salt (SrO) and sulfate (SrSO_4) or carbonate (SrCO_3) layers to obtain the anisotropic compounds : $\text{Sr}_4\text{Fe}_2\text{O}_{6.5}(\text{SO}_4)_{0.5}$ or $\text{Sr}_4\text{Fe}_2\text{O}_6(\text{CO}_3)$. The anisotropy is led by the atomic layered structure but also by the difference of electronegativity between the sulfate or carbonate groups and the oxygen atoms. In these compounds, hybridizations between the 3d states of iron and p anions ($\text{O}_{2p} - \text{Fe}_{3dz} - \text{SO}_4/\text{CO}_{3np}$) play a crucial role on the properties of electronic transport and on 2D magnetism. The Fe / Anions (O^{2-} , $\text{SO}_4^{2-}/\text{CO}_3^{2-}$) bonds should be then fully described and understood. To do this, a thorough crystallographic characterization is essential. Raman spectroscopy will contribute to the fine description of the geometry and the environment of the polyanionic groups that can be distributed in a pseudo-ordered way within the same layer.

Job description

The purpose of the project is to synthesize new mixed anion iron oxides by solid state routes in glove box (sealed silica tubes). The postdoc will have to characterize them by means X-ray and neutrons diffraction (nuclear and magnetic structures) at different temperatures. Raman spectroscopy will allow the structural characterization of sulfate/carbonate groups.

Qualifications

We seek a candidate with a PhD degree in a subject of relevance for conducting the project. Thorough experience of laboratory work (solid state synthesis, X ray and neutron diffraction) is needed while experience of in Raman spectroscopy is an advantage. The successful applicant should be strongly motivated, have the capability to work independently as well as in collaboration with others, and have good communication skills.

Application

Your complete application (CV - cover and recommendation letters) must be sent to: yohann.breard@ensicaen.fr

Funding

Labex EMC3 : The EMC3 projet so called « Energy Materials and Clean Combustion Center » is part of the laureate of the "Laboratoire d'Excellence" project call, an initiative of the French government's Investment Program for the Future.

Type of employment: Temporary position of 12 months-Contract type: Full time

First day of employment: According to agreement (January 2018)

Salary: Monthly salary -Number of positions: 1-Working hours: 100%-City: Caen-Country: France