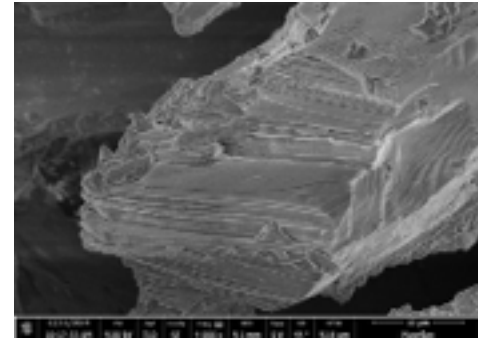


Labex MATISSE

Axe 4

Electronic transport in oxide nano-layers

Remi Fredericci



Hosting laboratories, teams and thesis supervisors names:

Hosting laboratory : Laboratoire de Physique et d'Etude des Matériaux (LPEM). Team name : ELEMAG. Thesis supervisor name : LERIDON Brigitte - SHUKLA Abhay (co-supervisor/IMPMC)

Research project

During my PhD project, I am synthesizing by chemical process (IMN-Nantes), doing the characterization (IMPMC-Paris) and investigating the electronic properties (LPEM-Paris) of ternary oxide nano-layers made of Rubidium and Titanium ($Rb_2Ti_2O_5$). The study over the temperature of the electronic transport using a PPMS shows important resistance switches of several orders of magnitude between 200K and 300K. Although this observation could be linked to pyroelectric and ferroelectric phenomena, the literature says that this family of compound has a centrosymmetric space group that forbids this aspect (space group found with DRX measurements). To confirm this space group, a complete study of the structure is led at the IMPMC using X-Ray diffraction, InfraRed measurement, Raman scattering and DFT computations for deeper investigations and complementary results.

Summarize your scientific results & impacts

Electronic transport shows that transitions occur at 200K and 300K. These two temperatures are linked to different phenomena which haven't been determined yet (Main ideas : apparition of dipolar moments and mention of oxygen vacancies). Till now, the IR and RX have showed that these two transitions could not be caused by structural transitions. Even though the DRX measurements show that $Rb_2Ti_2O_5$ is centrosymmetric, it is not enough to prove the nature of a space group. IR measurements and DFT computations are actually performed to fully