

Title: *Design of high pressure doped ZnO with rock-salt structure*

Keywords: Zinc oxyde, high pressure, materials design, bandgap engineering

Scientific description:

The main objective of this project is to explore new doped ZnO materials using high pressure as a stabilization tool for electronic materials with bandgap in visible range.

Exploring metastable nano and bulk materials based on ZnO is a challenging task for numerous industrial applications, and high pressure is one of the promising synthetic route. At the same time, high pressure polytype of ZnO (rock-salt ZnO structure) cannot be simply recovered at ambient conditions, and synthesis of rs-ZnO forms is sensitive to nano-ZnO precursors, sample environment and even compression conditions, indicative that kinetics of nucleation and growth plays important role. The research will be focused on (i) for understanding thermodynamics and kinetics of phase transformation in ZnO, as well as (ii) for synthesis new ZnO materials. IMPMC will provide high-pressure facilities (up to 20 GPa and 2500 K) in house and at synchrotrons for the realisation of the project.

Techniques/methods in use: High pressure techniques, Raman, X-ray diffraction

Applicant skills:

Industrial partnership: No

Internship supervisor(s) : Alexandre Courac (alexandre.courac@upmc.fr)
Yann Le Godec (yann.le_godec@sorbonne-universite.fr)

Internship location: IMPMC, 4 place Jussieu, 75005 Paris

Possibility for a Doctoral thesis: Yes