Development of novel Multiferroic Metal-Organic Frameworks (MOFs) for storage applications

In recent years, hybrid organic–inorganic materials have fascinated meticulous attention because of their extensive potential applications such as in storage and separation, catalysis, and photoluminescence, and as nonlinear optics, solar cells and magneto electric multifunctional materials. These applications can be combined and integrated into multifunctional metal–organic frameworks (MOFs). Even though remarkable development so far, tuning MOFs properties in a balanced and efficient way remains a considerable challenge that requires careful consideration of chemical substitution. The progress in metal–organic framework (MOF) research has opened up new possibilities to achieve hybrid materials with a rich variety of functional and even multifunctional properties. Among them, formate-based MOFs with magnetic, dielectric and multiferroic properties have been reported and are particularly interesting.

This proposal aimed to prepare the multiferroic MOF material that adopts the ABX_3 perovskite structural design in which A = pronated amine, B = $M^{I}_{1-x}M^{II}_{x}$ is a bivalent metal ion (Fe, Co, Ni, Cu, Zn or Mn) and X is the Halide. The above said material will be prepared by hydrothermal method. The required crystal will be grown using the slow evaporation technique. The following characterization technique XRD, FTIR, FT-Raman, DSC, Dielectric, Magnetic, Ferroelectric, SEM/EDAX and Z-Scan will be used to identify the suitability of the material for data storage applications.

Keywords:
Metal-Organic Frameworks, Multiferroic, Perovskite Structure (ABX3), Data storage, Z-Scan and Hydrothermal method