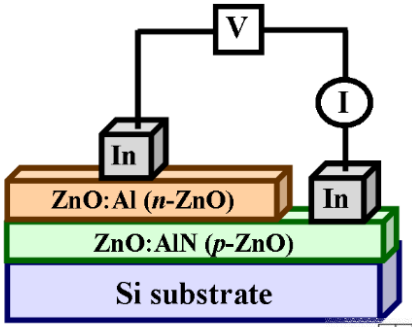
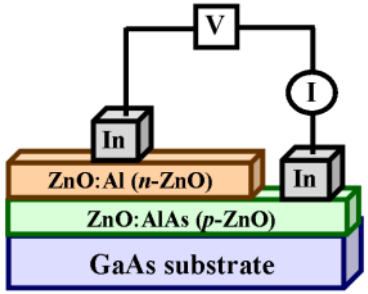
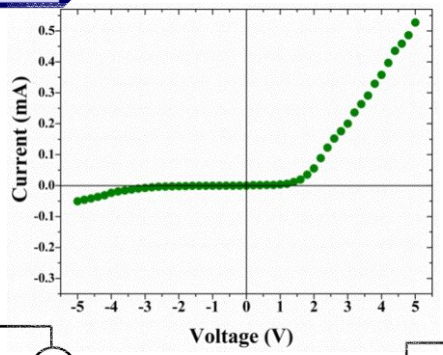
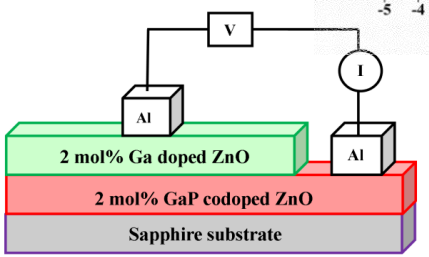
Activities of Our Research Group

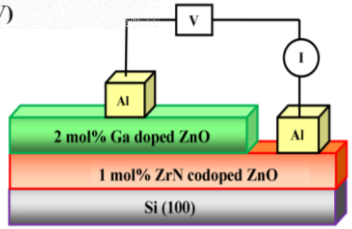
Fabrication of ZnO homo Junctions for LEDs applications



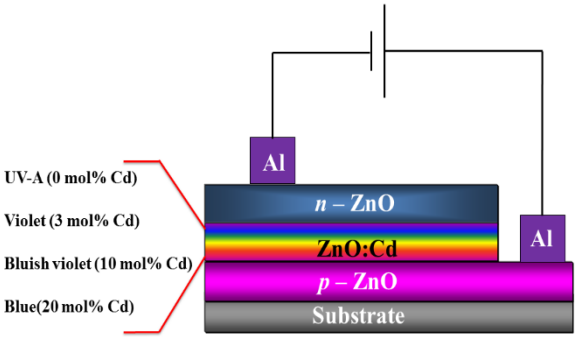


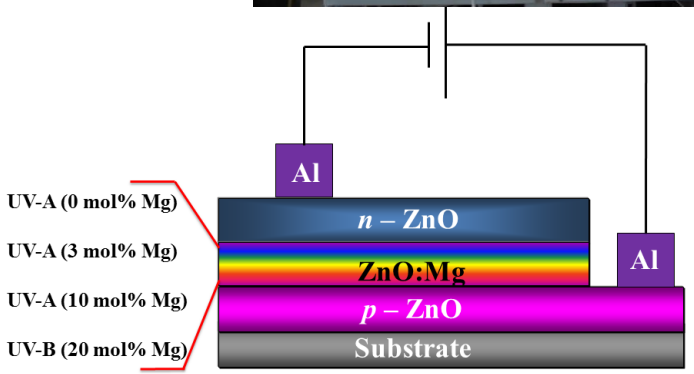


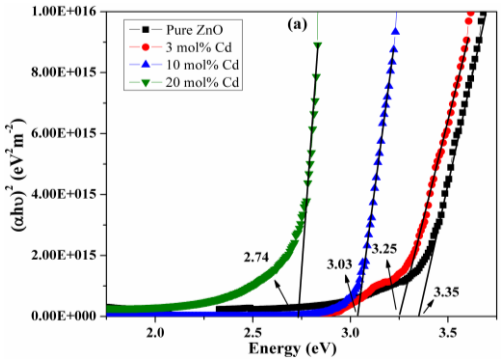


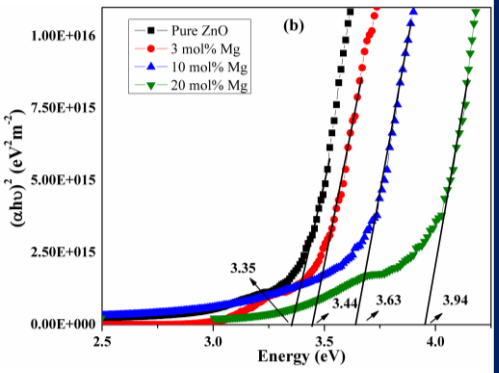


Band Gap engineering in ZnO p-n Junctions by Cd and Mg doping



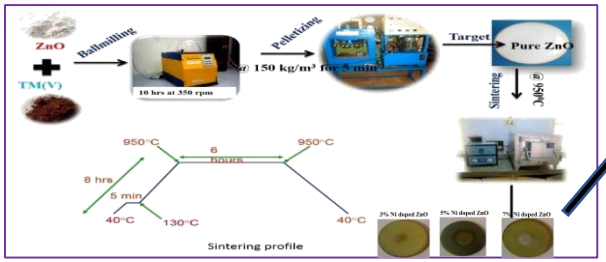


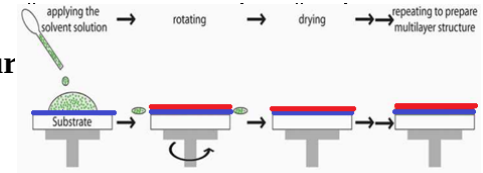


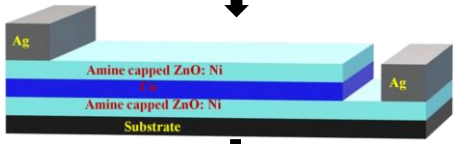


Surface functionalization in TM doped ZnO thin films for Spintronics Applications

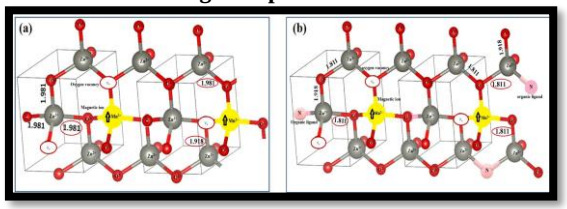
- **Transition Metals (TM) doped ZnO films are grown by R.F Sputtering**
- **The grown films are capped using organic ligands to enhance Ferromagnetism**
- **These films are used to fabricate GMR/TMR structur**



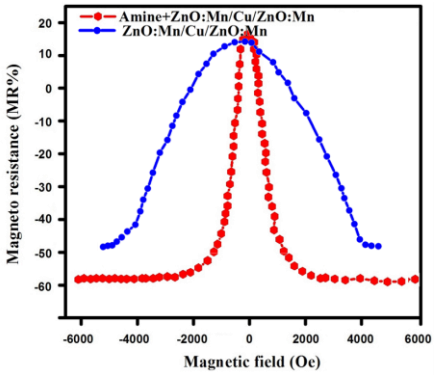


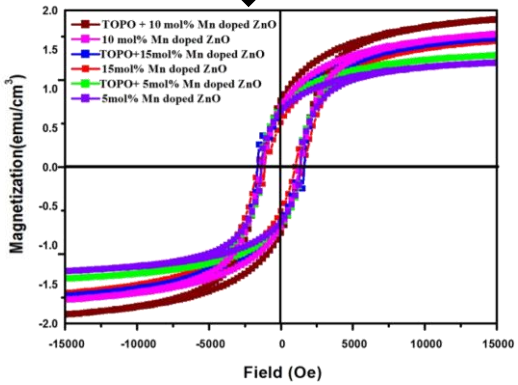


Bound magnetic polaron formation in DMS

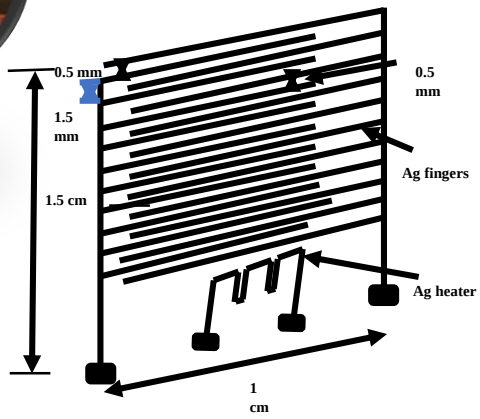


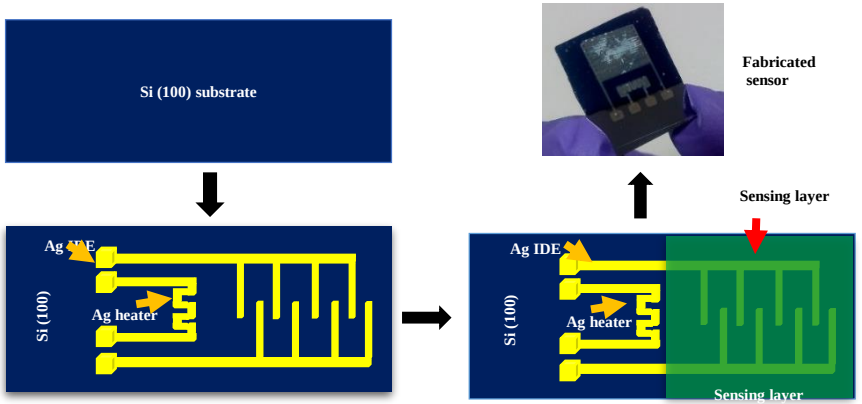
Negative MR ratio of GMR

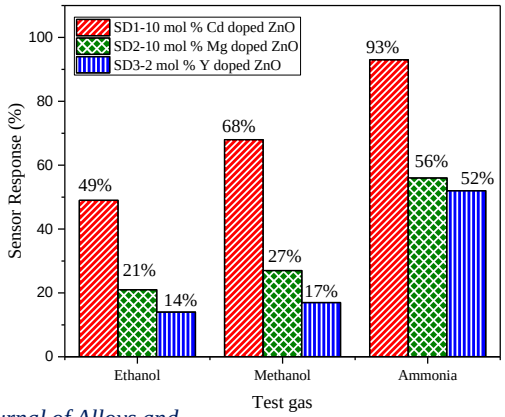


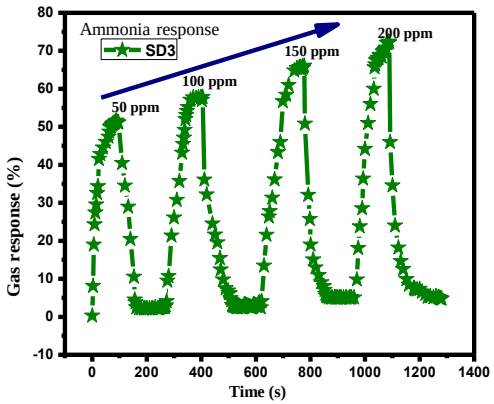


Fabrication of ZnO-Ag Interdigitated electrode (IDE) Sensor by R.F. Sputtering



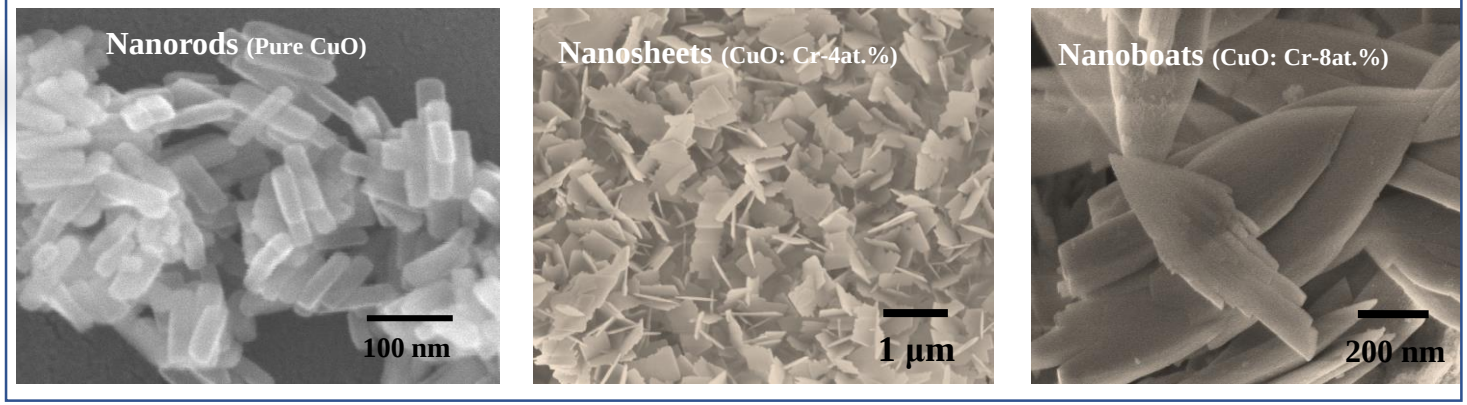


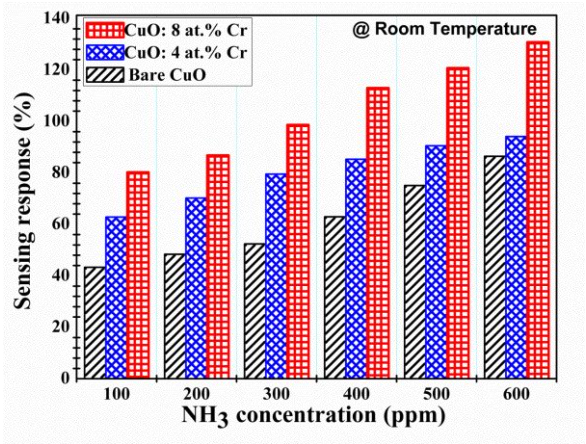


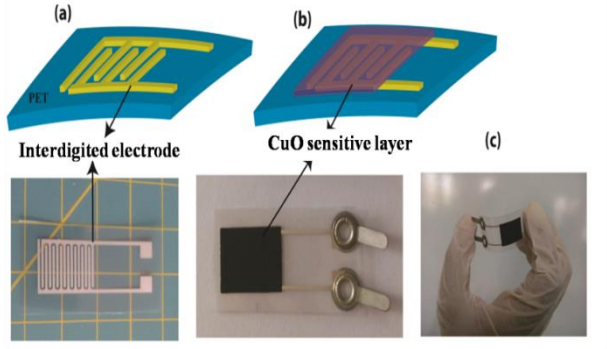


E. Vionth and **N.Gopalakrishnan**, *Journal of Alloys and Compounds.* 824, (2020), 153900

Effect of Morphology on NH3 sensing in CuO:Cr nanostructures

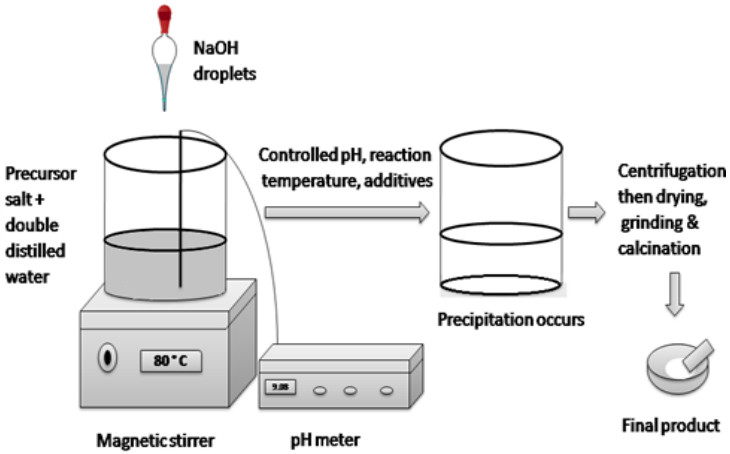


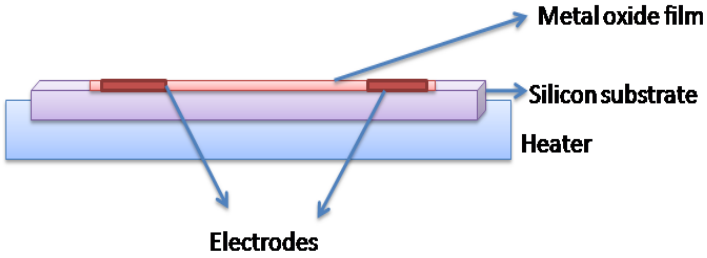


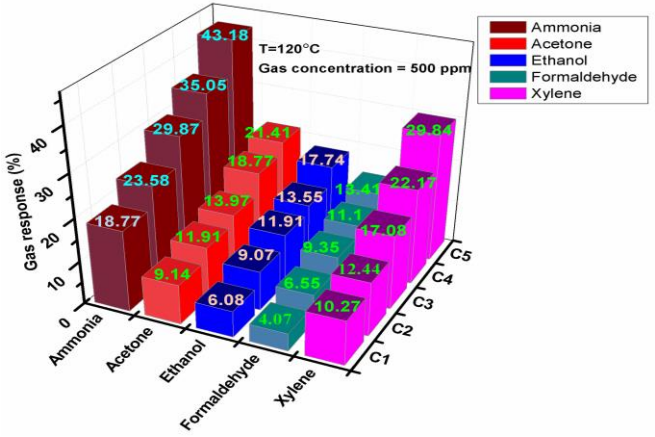


Flexible CuO sensor on PET substrate by screen printing

ZrO_2 nanostructure by Precipitation method for gas sensing

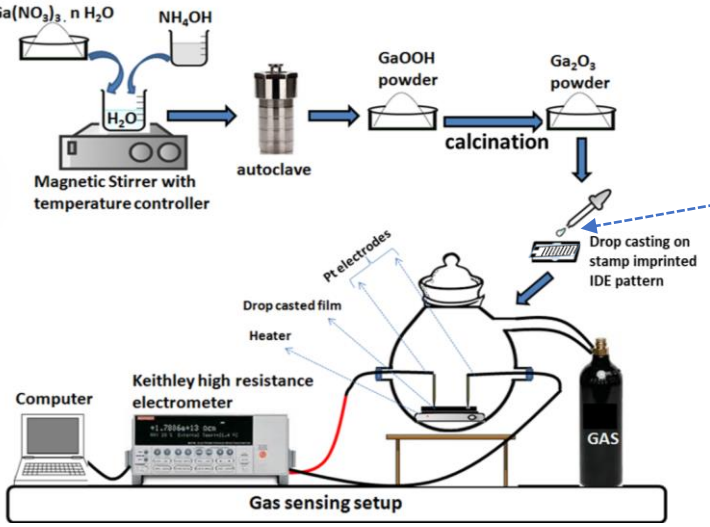


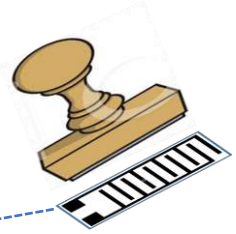




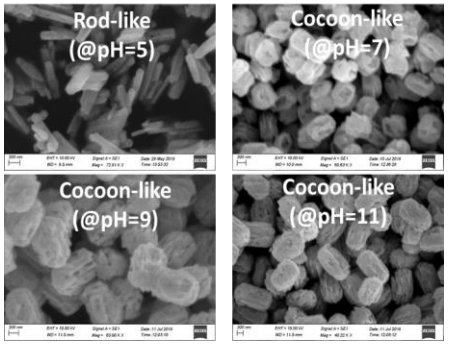
E.Hemalatha and N.**Gopalakrishnan** Appl. Phys. A 125, 493 (2019)

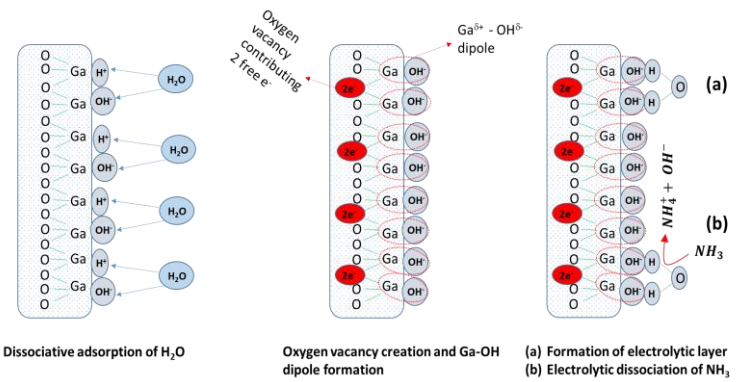
Hydrothermal Synthesis of β-Ga_2O_3 for room temperature NH_3 sensing

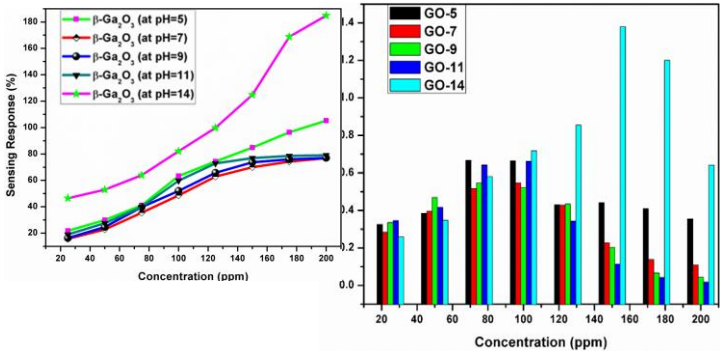




Stamp imprinted silver IDE pattern on glass substrate

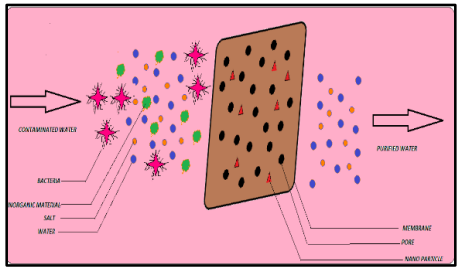




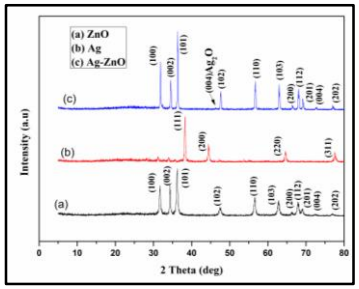


Nanofillers (ZnO, Ag & Ag-ZnO) Incorporated PSF/PVP Membranes for Water Purification

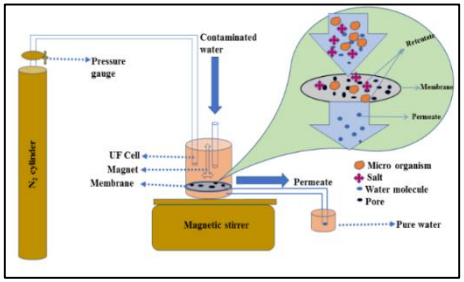
Schematic diagram of membrane separation



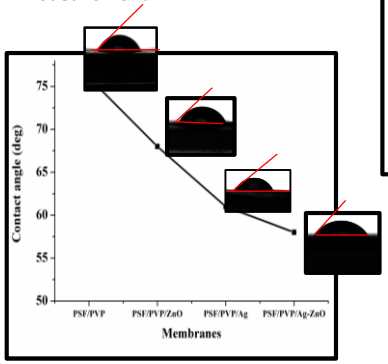
XRD analysis - nanofillers



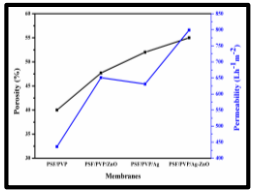
Dead end Ultra-filtration setup



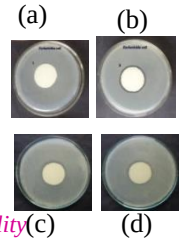
Contact angle measurement

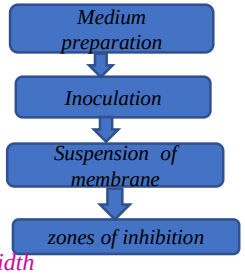


Water Permeability

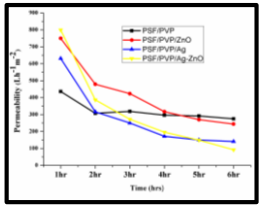


Antibacterial activity- Disc diffusion method





Time dependent Water Permeability

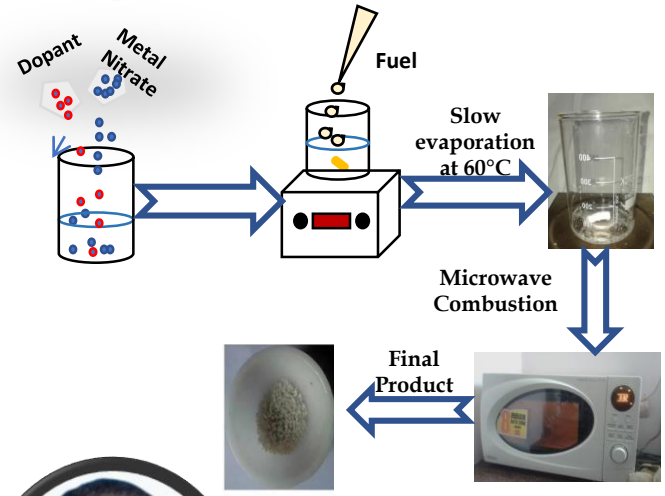


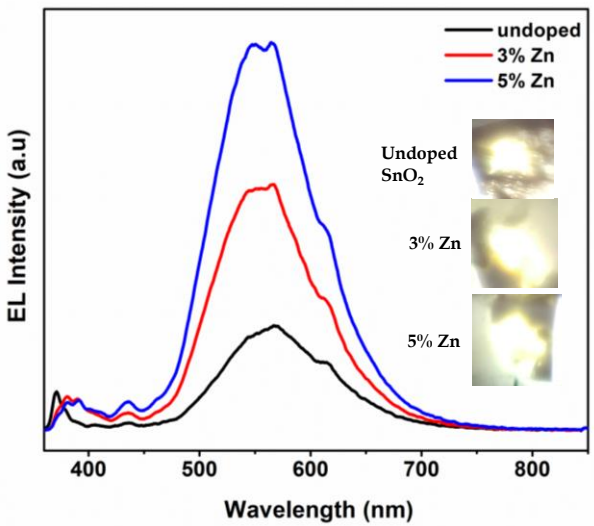
Inhibition Zone width

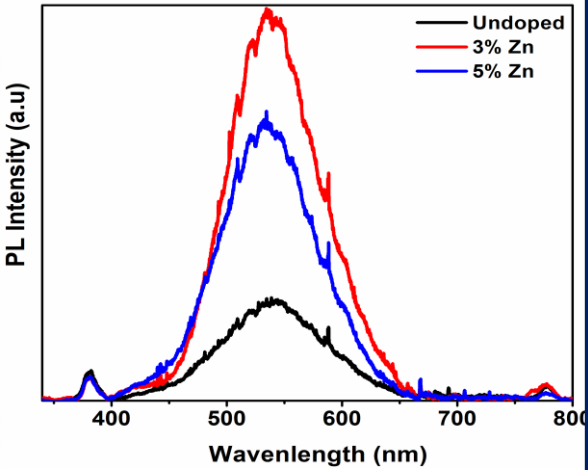
(a)PSF/PVP – 0.0mm
(b)PSF/PVP/ZnO - 1.20mm
(c)PSF/PVP/Ag - 20 mm
(d)PSF/PVP/Ag-ZnO – 19.13 mm

- ✓ **Enhanced hydrophilicity**
- ✓ **Nanoporous structure**
- ✓ **High water Permeability**
- ✓ **High antibacterial activity**

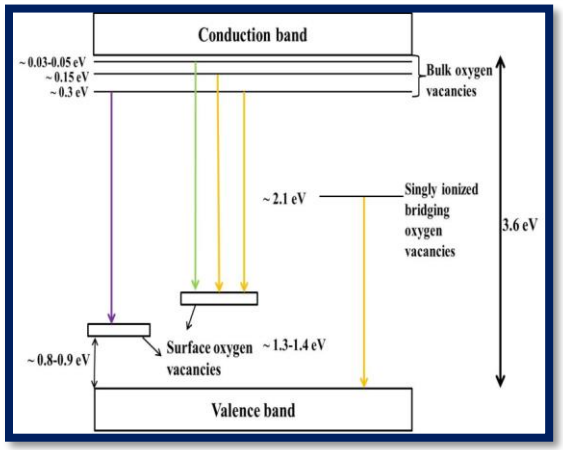
Metal Oxide Nanoparticles for Phosphor Converted White Light Generation



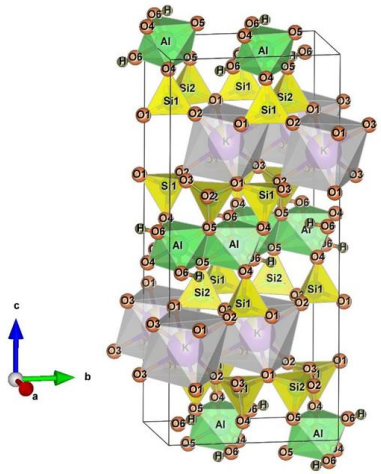


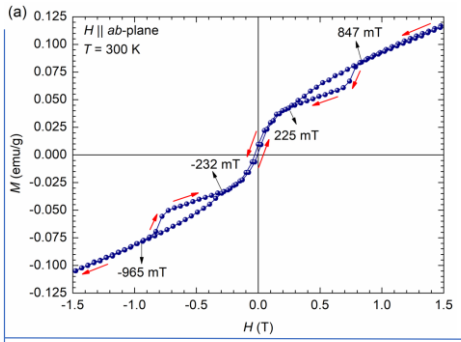


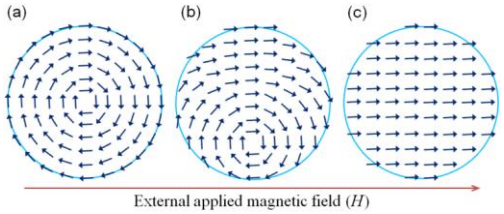
- Non activator doped Metal oxide Nanoparticles
- Microwave assisted sol-gel combustion
- Band gap Engineering
- Defect induced visible emission
- Near-UV excitable White Light Emitting Phosphors

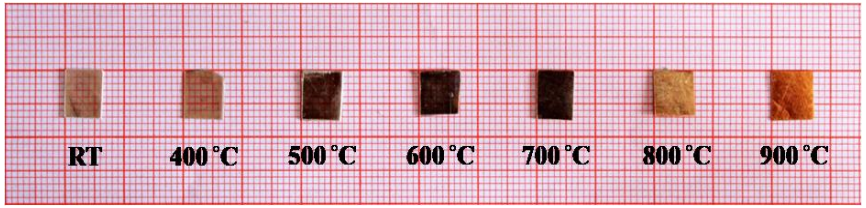


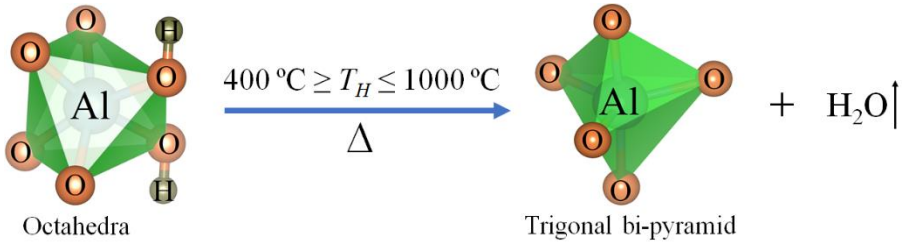
Experimental investigation on the graphene-like 2D materials: Muscovite and Biotite





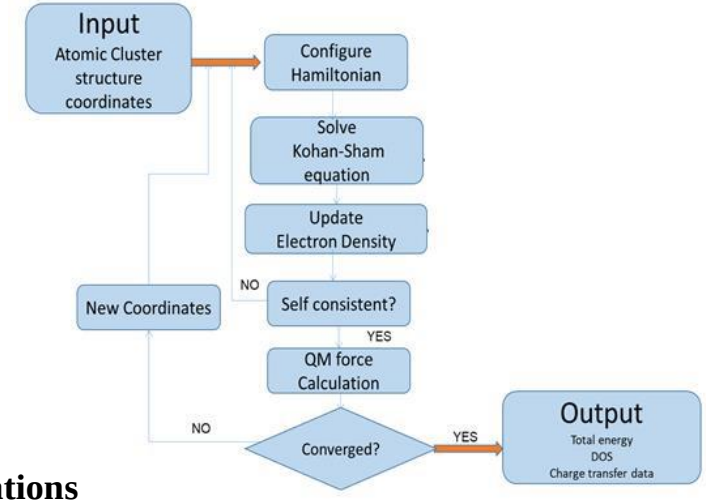


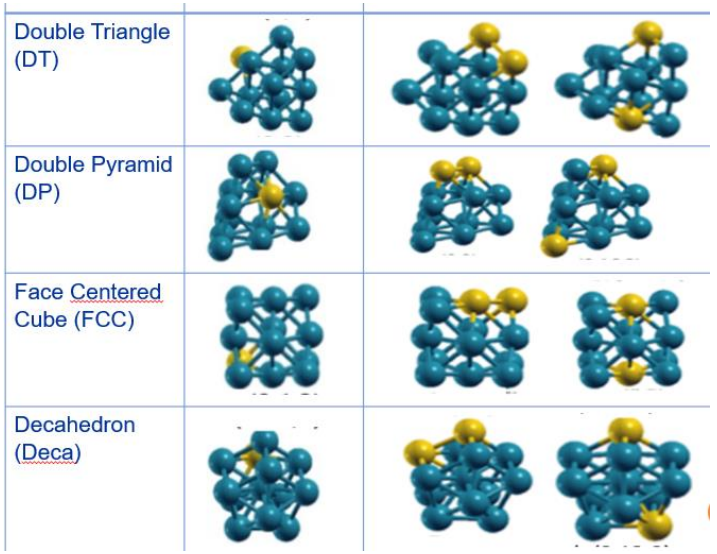




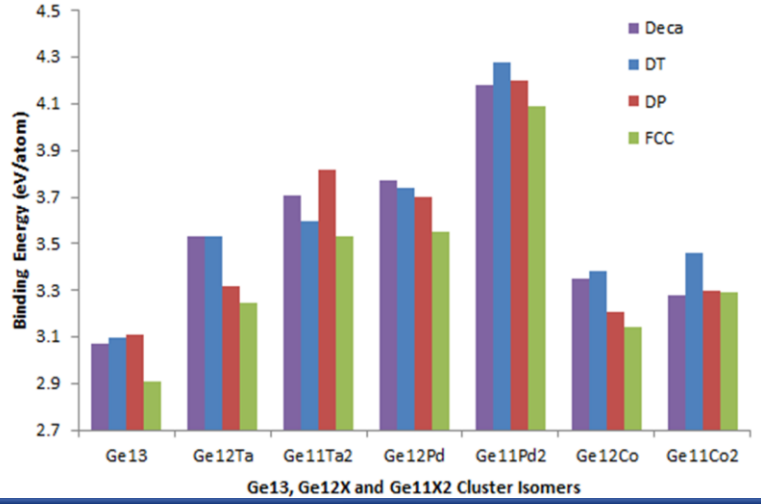
M. Kirubanithy, N. Gopalakrishnan, K. Balamurugan, *Mater. Res. Exp.*, 5 (2018) 096103

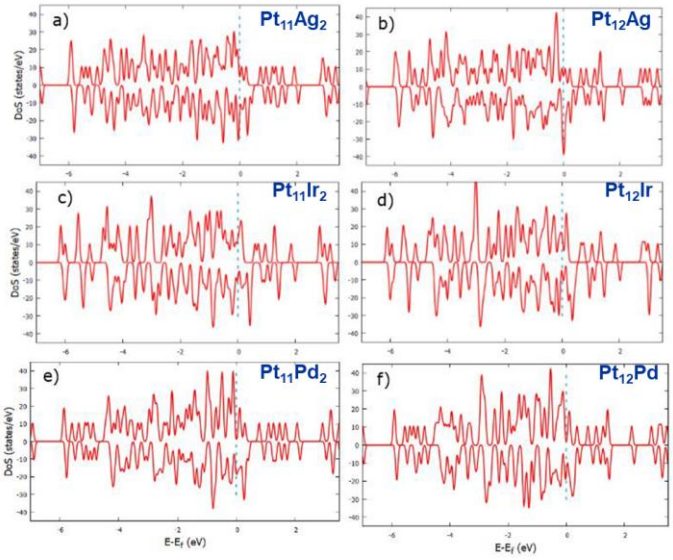
Investigations on Single and Double Atoms Doping in Ge_{13} and Pt_{13} Clusters by DFT





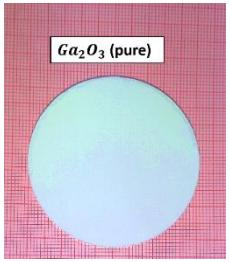
- **Structural analysis**
- **Binding Energy calculations**
- **HOMO-LUMO gap, DOS and PDOS analysis**
- **Finding the Lowest Energy Isomers**



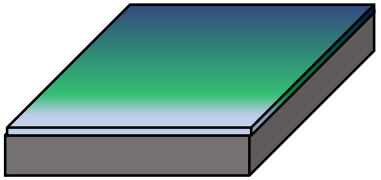


RF Magnetron Sputtered β-Ga_2O_3 Thin Film for Solar Blind Photodetector (SBPD)

Target Preparation



RF Magnetron Sputtering



Thin film