Invited Lecture
3rd Asian Conference on Chemosensors and Imaging Probes (AsianChIP – 2019)

Metal organic frameworks and their composites for electrochemical sensing

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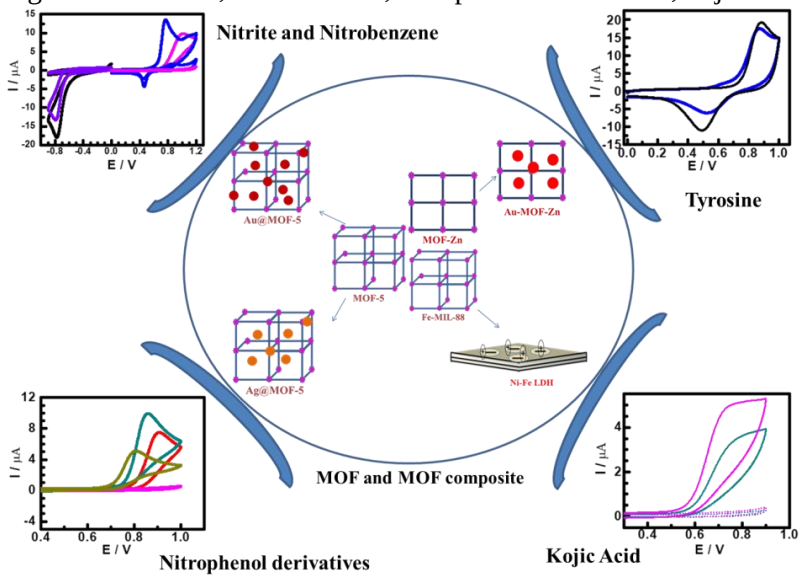
Abstract:
Synthesis of carefully designed metal-organic frameworks (MOFs) and their composites with tailor made properties to suit the desired target is a burning research topic in many fields of chemical research nowadays. MOFs, a new class of functional porous materials exhibit advantageous properties like controllable morphology, tunable pore size and high specific surface area which are highly desired in electrocatalysis and subsequent applications. To achieve high efficiency of the chosen catalytic process, MOFs may be further functionalized with organic ligands or incorporated with metal nanoparticles which may synergistically enhance the preferred process. Such MOFs and composite of MOFs can be used as electrode modifiers for electrochemical applications such as supercapacitors, batteries, electrocatalysis and electrochemical sensors. The MOF composites ensure superior electrocatalytic and electrochemical sensing properties than the unmodified MOFs. Accordingly in this work, gold nanoparticles incorporated into MOF-5 (Au-MOF-5), silver nanoparticles incorporated into MOF-5 (Ag@MOF-5(Zn)), MOF derived Ni-Fe layered double hydroxide (Ni-Fe LDH) and gold nanoparticles incorporated into a zinc based MOF (Au-MOF-Zn) are used as electrode modifiers for the electrochemical efficient recognition of nitrite, nitrobenzene, nitrophenol derivatives, kojic acid and tyrosine.



Schematic representation of the synthetic route and electrochemical sensing applications of MOF composites.

Acknowledgements: DST-ASEAN (IMRC/AISTDF/R&D/P-16/2018), New Delhi for financial support. DKY acknowledges UGC for the senior research fellowship (SRF).

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Bio-Sketch of the Speaker

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Dr. Vellaichamy Ganesan completed his B.Sc. from Ayya Nadar Janaki Ammal College, Sivakasi, M.Sc. from Bharathidasan University, Trichy and Ph.D. from Madurai Kamaraj University, Madurai, Tamil Nadu. Later he visited University of Houston, USA and Université de Lorraine, Nancy, France for postdoctoral researches. At present he is working as an Associate Professor in Banaras Hindu University, Varanasi. He is a recipient of Indo-US Science and Technology Forum Fellowship (IUSSTF Fellow), USA, Commonwealth Fellowship, UK, and DAAD Fellowship, Germany. His current areas of research interest include electrochemical sensors, materials electrochemistry, catalytic materials for fuel cells, electrocatalysis, metal organic frameworks, photocatalysis, *etc.* For his credit he published more than 80 papers in reputed national and international journals.