S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Chemical, Biological & Macro-Molecular Sciences

05th July, 2022 **4.00 PM** **FERMION / ONLINE**

SPEAKER

Dr. Tamas Kumar Panda,
Assistant Professor, Centre for Clean Environment and Department of Chemistry,
Vellore Institute of Technology, Vellore campus, Tamilnadu, India

TITLE OF THE TALK

Mechanochemistry: An Opportunity to do Engineering in Metal Organic Frameworks (MOFs)

ABSTRACT

Mechanochemical synthesis exhibits enormous potential for the clean, economic and environmental-friendly efficient route for the chemical and structural transformation of molecules and materials. Over the years, mechanochemical grinding method has been used in important organic conversions such as asymmetric organocatalytic aldol reactions, Knoevenagel condensations, oxidative amidation of aldehydes etc. Recently the mechanochemical synthesis via neat grinding, liquid-assisted grinding (LAG) have shown significant potential for the construction of extended frameworks. My work based on an attempt to design and synthesis of new phase pure MOF materials by solid state grinding or ball mill method. These types of mechano synthesized Phase pure MOF material is very rare and not possible to synthesize by traditional solvent based synthesis where the mixture of isomeric forms have been isolated. Time dependent kinetics study during the mechanosynthesis process revealed the formation of new metastable phases with the function of grinding time which is confirmed by powder X-ray diffractions. Less crystallinity, short of long-range order and creation of defects in the structure of these mechanochemically synthesized MOFs afforded enhanced electrocatalytic activity towards oxygen evolution reaction (OER) in Fuel cell. Additionally, I will explain about the solvent-free mechanical milling process for two distinct MOF crystals induced the formation of a solid solution, which is also not feasible by conventional solution-based synthesis. This is the unique way to discover new phase of materials by mechanochemical synthesis which are unexplored yet in Metal-organic based materials.

Contd….pg :2

S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

References:
1) T. Panda, S. Horike, K. Hagi, N. Ogiwara, K. Kadota, T. Itakura, M. Tsujimoto, S. Kitagawa, Angew. Chem., Int. Ed., 2017, 56, 2413
2) P. Jhariat, P. Kumari, T. Panda. CrystEngComm. 2020, 22, 6425-6443
3) P. Kumari, P. Jhariat, S. Senthil and T. Panda. Manuscript Submitted. 2022.
4) T. Panda, T. Kundu and R. Banerjee. Chem. Commun., 2013, 49, 6197-6199.
5) T. Panda, T. Kundu and R. Banerjee. Chem. Commun., 2012, 48, 5464-5466
6) T. Panda, P. Pachfule and R. Banerjee. Chem. Commun., 2011, 47, 7674–7676

HOST FACULTY

Prof. Rajib K Mitra and Dr. Pradip S Pachfule
CHEMICAL, BIOLOGICAL & MACRO-MOLECULAR SCIENCES

****