Dr. MAHASWETA NANDI

Education:

September 2003: M.Sc. in Chemistry from University of Calcutta, Kolkata, India

December 2008: Ph.D. in Chemistry from Indian Association for the Cultivation of Science, Kolkata, India

Thesis Title: SYNTHESIS, CHARACTERIZATION AND CATALYTIC PROPERTIES OF NOVEL MICROPOROUS AND MESOPOROUS MATERIALS

Employment experience:

March 2009 – Present: Assistant Professor, Visva-Bharati University, Santiniketan, India (On leave)

September 2010 – Present: Specially Appointed Assistant Professor, GCOE

Professor Hiroshi Uyama's Laboratory, Department of Applied Chemistry, Osaka University, Suita, JAPAN

Awards:

2003: Awarded CSIR-UGC National Eligibility Test (NET) for Junior Research Fellowship in Chemical Sciences by Council of Scientific and Industrial Research, India, 2003

2003: Qualified Graduate Aptitude Test in Engineering (GATE), 2003

2003: Qualified State Level Eligibility Test (SLET), 2003

Research area:

Design and syntheses of mesoporous and microporous materials

Synthesis of catalysts using silica support by post-synthetic immoblilization of inorganic complexes as well as by *in situ* grafting; Liquid phase catalytic reactions

Adsorption properties of porous materials for gas storage application under high pressure

Key words: Templating, Structure design, Luminescence, Adsorption, Catalysis

Selected publications:

1. From Porous Metal Phosphates to Oxophenylphosphates: A Review
Mahasweta Nandi, Asim Bhaumik and Nawal K. Mal
Recent Patents in Materials Science 3 (2010) 151-166

2. Highly efficient hydroformylation of 1-hexene over ortho-metalated Rhodium (I) complex anchored on 2D-hexagonal mesoporous organosilica
Mahasweta Nandi, Manirul Islam, Paromita Mandal and Asim Bhaumik
European Journal of Inorganic Chemistry (In Press, 2010)

3. New 3D-hexagonal mesoporous silica having high H_2 adsorption capacity
Mahasweta Nandi, Mohona Sarkar, Krishanu Sarkar and Asim Bhaumik
Journal of Physical Chemistry C 113 (2009) 6839–6844

4. Facile Suzuki coupling over ortho-metalated Palladium(II) complex anchored on 2D-hexagonal mesoporous organosilica
Krishanu Sarkar, Mahasweta Nandi, Manirul Islam and Asim Bhaumik
Applied Catalysis A: General 352 (2009) 81-86

5. Mesoporous polyaniline having high conductivity at room temperature
Mahasweta Nandi, Rupali Gangopadhyay and Asim Bhaumik
Microporous and Mesoporous Materials 109 (2008) 239-247

6. Enhancement in microporosity and catalytic activity on grafting silica and organosilica moieties in lamellar titanium phosphate framework
Krishanu Sarkar, Mahasweta Nandi and Asim Bhaumik
Applied Catalysis A: General 343 (2008) 55-61

7. Nickel Complexes with N_2O Donor Ligands: Syntheses, Structures, Catalysis and Magnetic Studies (Appeared as Cover Picture)
Jishnunil Chakraborty, Mahasweta Nandi, Heike Mayer-Figge, William S. Sheldrick, Lorenzo Sorace, Asim Bhaumik and Pradyot Banerjee
European Journal of Inorganic Chemistry (2007) 5033-5044

8. Novel polyether-inorganic hybrid mesoporous silica synthesized through in situ incorporation of organic functionality
Mahasweta Nandi, Nawal Kishor Mal and Asim Bhaumik
Journal of Non-Crystalline Solids 352 (2006) 5408-5412

Research Statement:

Polymeric materials with interconnected pores, so-called monoliths, have attracted much attention due to their numerous uses in a wide range of commercial products including ion-exchange applications, supports for liquid chromatography, metal recovery, and cosmetics. Generally two approaches are used to generate porosity, first one involving *in situ* use of supramolecular micellar assemblies of surfactant molecules during polymerization and subsequent removal of the surfactants and the second one is through spontaneous phase separation of an initially homogeneous solution upon cooling and an arrest thereof in an early stage due to gelation of the polymer rich phase. In the present work, the later approach for the synthesis of porous polymeric frameworks will be explored. This idea will be extended for the synthesis of epoxy acrylate resins which can give rise to reactive porous materials with interesting properties.

My goal:

The aim of the project is to design reactive monoliths based on acrylic resin with a glycidyl group which corresponds to a polymeric ester of acrylic or methacrylic acid. Various ways to functionalize these structures by taking advantage of the reactive epoxy units will be explored. Using different types of reactions, i.e. hydrolysis, aminolysis and nucleophilic reactions, we aim to develop activated monoliths that find applications in bio-environmental chemistry. One of our interests is to couple the glycidyl group to bio-molecules, for example enzymes, to create bioreactors. Another challenge lays in the development of devices for metal recovery that can be achieved by coupling the epoxy-groups to chelating agents. Furthermore, introducing active sites with a large affinity for charged compounds leads to applications as ion exchange resins. These are especially suited for large bio-molecules because of the slow diffusion rate through the monolith pores. In all cases we are looking for new technologies and devices that combine the unique structural properties of the monolith with smart biologically relevant chemistry as solutions for bio-environmental related problems.