Experiences in collaborating with Academia

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The 21st century marketplace is moving towards sustainable development and without this approach our future would be at risk. To avert the worst impact of climate change and preserve a livable planet, industries need to develop and adopt more sustainable processes with low or nil environmental footprints. Innovation in science & technology is key to offer environmentally solutions for today's industries.

To foster innovation in industry relevant topics there is an urgent need of industry-academia collaboration. Collaborations between industry and academia have been recognized as an important alternative to expose students to more realistic problems and situations than the ones that are typically offered to them. In academia, researchers mainly focus on fundamental aspects of science and publications/patents often considered ultimate output. Industries, on the other hand, consider larger aspects of innovation such as novelty, economic viability, environmental footprint, supply chain, market demand, competitive advantages, policies, and market drivers etc. A right industry-academic collaboration will not only provide holistic opportunities for students to gain real-world experience and develop job-ready skills but also can propel innovation at a faster pace.

At Bharat Petroleum R&D, we have been collaborating with various academic institutes on emerging topics such as CCU (direct conversion of CO_2 to methanol, direct conversion of syngas to Dimethyl ether, dry reforming of methane), selective hydrogenation of bio-derived molecules such as furfural to value added products etc. The learning opportunities offered to students, challenges faced, research output obtained, and rich experiences gained during collaboration with academia will be presented.

Key Words: Sustainable development, Academic-Industry Collaboration, CCU

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Dr. Chanchal Samanta, did his Ph.D from National Chemical Laboratory (NCL), Pune. He did his postdoctoral studies from South Korea and Germany before Joining BPCL in 2007. He is currently working as a Chief Manager(R&D) at Bharat Petroleum, Corporate Research and Development Center, Greater Noida.

He has worked in the following research areas

- Direct oxidation of hydrogen to hydrogen peroxide
- Catalytic and CO assisted decomposition of N_2O and development of catalytic converters
- Coal-to-Liquid (CTL)/Gas-to-Liquid (GTL) Technology Development
  Successfully handled CHT sponsored CTL projects. Synthesized and tested various cobalt and iron-based catalysts for Fischer-Tropsch Synthesis
- Syngas to methanol and DME catalyst and process technology development under Australia India strategic Grand Challenge project (http://www.greencarcongress.com/2013/10/201321010-dme.html)
- Slurry hydrocracking of petroleum residue (CHT sponsored consortia project project in collaboration with IIP/HPCL/BPCL/EIL)
- Selective hydrogenation bio-mass derived molecules such as furfural, levulinic acid to value added productions
- CO_2 to methanol (won Petrotech research fellowship for hiring Ph.D student under this programme)
- Syngas to olefins (CHT sponsored project in collaboration with CSIR-IICT, Hyderabad)

Publications: More than 60 papers in peer reviewed international and national Journals and presentations in national and international conferences.

Patents: He has filed a number of patents in India and USA.

Review articles: His single authored review article “Direct synthesis of hydrogen peroxide from hydrogen and oxygen: An overview of recent developments in the process” Applied Catalysis A: Gen Volume 350, Issue 2, 30 November 2008, Pages 133-149 was adjusted one of the 25 Hottest Articles Oct-Dec 2008 and Jan-March 2009) and received over 500 citations . Very recently, he has published a review article “Advantages and limitations of catalytic oxidation with hydrogen peroxide: from bulk chemicals to lab scale process” in Catalysis Reviews: Science and Engineering having impact factor above 20 through collaboration with academia.

Book Chapter: He has book chapter on the topic C3-Based Petrochemicals: Recent Advances in Processes and Catalysts in “Catalysis for clean energy and environmental sustainability” published by Spinger, Switzerland.

Ph.D Supervision : As a Ph.D co-guide he has supervised Ph.D Thesis work for 5 Ph.D students under industry-academic research collaboration programme. Two students received Ph.D under Petrotech Society Research Fellowship Scheme.