

Visible Light Photoredox Catalysis towards Sustainable Future

Overview

The development of efficient strategies for the synthesis of biologically relevant small molecules is one of the most important research areas. Towards this, selective C–H bond functionalization strategies involving atom and step economical processes are challenging tasks in synthetic chemistry. In recent years, visible light photoredox catalysis has emerged into a powerful tool for the development of new and valuable transformations. In photoredox catalysis usually inert functionalities in the starting organic molecules are transformed into reactive intermediates upon single-electron oxidation or reduction. Visible light as a traceless, safe and readily available (from LEDs) reagent provides the redox energy initiating the conversions. This enables reactions at extremely mild conditions with often excellent functional group tolerance. Combined with organo-, metal-, or acid-base catalysis a large range of selective reactions can be performed in an energy efficient and therefore sustainable way. Photoredox catalysis has proven to be a valuable tool for the construction of complex architecture.

Objectives

The primary objective of the proposed course is to provide the basic concepts of photoredox processes and its applications to the students and faculty members to seek knowledge and experience from reputed International faculty. Course participants will learn these topics through lectures and hands-on experiments. The lectures will be delivered by **Professor Dr. Burkhard König**, who is renowned scientist in the area of visible photoredox chemistry. The course co-ordinator, **Dr. Alakesh Bisai**, will share few lectures and tutorials. There will be a series of twenty lectures covering following key topics within the proposed time frame.

Modules	Aug. 22 - Sept. 2, 2016 (Last date of Registration: Aug. 12, 2016) A: Basic concepts in Photophysics, Photoredox Catalysis, Practical Issues B: Classic Reactions in Photochemistry C: Proton-Coupled Electron Transfer in Photoredox catalysis D: Photooxidations, Oxidations of Inorganic Anions, Biomimetic Processes E: Accelerating Discovery and Optimization of Photoredox Catalysis F: Photocatalytic Cross Coupling Reactions G: Synergistic Photoredox – Transition Metal Catalysis H: Synergistic Photoredox – Organocatalysis I: Cycloaddition, Cyclization Reactions J: Decarboxylative Coupling Processes Number of participants for the course will be limited to fifty.
You Should Attend If...	<ul style="list-style-type: none">▪ You are a BS-MS major or Ph.D. in Chemistry interested in photo-catalysis.▪ You are a faculty from academia interested in learning research for sustainable future.▪ You are a synthetic chemist interested in total synthesis of biologically relevant molecules.▪ You are a Material Chemist interested in designing organic materials using photo-redox catalysis.
Fees	The participation fees for taking the course is as follows: Participants from abroad : US \$200 Industry/ Research Organizations: 5000/- Academic Institutions: 500/- The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

The Faculty



Professor Dr. Burkhard König received his doctorate degree in 1991 from the University of Hamburg under the direction of Prof. de Meijere. He continued his scientific education as a postdoctoral fellow with Prof. M. A. Bennett, Research School of Chemistry, Australian National University, Canberra, and Prof. B. M. Trost, Stanford University, CA. In 1996 he obtained his 'Habilitation' at the University of Braunschweig, Germany. Since 1999 he is full professor of organic chemistry at the University of Regensburg, Germany. His current research interests focus on the development of synthetic receptors for the recognition of biological target structures and the application of visible light chemical photocatalysis for organic synthesis. His scientific contribution has been well appreciated in the form of various awards and honours, such as '*Literaturpreis of the Fonds of the German Chemical Industry*' in 2007, '*Chairman of the Liebig Vereinigung*' (National organic division) since 2008, Member of the executive board of the '*German Chemical Society*' (2004 - 2007), Chairman of the '*Arbeitsgemeinschaft Deutscher Universitätsprofessoren Chemie (ADUC)*' (2005-2007), Member of the International Advisory Board of the '*Institute for Organic Chemistry and Biochemistry of the Czech Academy of Sciences, Prag*' since 2004, Member of the International Advisory Board of the '*European Journal of Organic Chemistry*' since 2004, Invitation fellowship award of the '*Japan Society for the Promotion of Science*' in 1996, Award of the '*Dr. Otto Röhm Gedächtnisstiftung*' in 1995, to name a few. Currently, he is the Coordinator and active partner of **INDIGO** programme (*Indian-German Graduate School of Advanced Organic Synthesis for a Sustainable Future*), which is one of most important program based on '*Sustainable Chemistry - Catalytic Transformations of Renewable Resources to Fine Chemicals and Biologically Active Compounds*' [<http://www.sustainable-chemistry.de/INDIGO/members.phtml>]



Dr. Alakesh Bisai received his M.Sc. from BHU, Varanasi in 2000 and Ph.D. from IIT Kanpur in Sept. 2006 under the guidance of Prof. Vinod K. Singh. Immediately afterward, he moved to the College of Chemistry, University of California at Berkeley, CA for postdoctoral research (Oct. 2006- Dec. 2009) with Prof. Richmond Sarpong. During his stay at UC Berkeley, he received GRC (*Gordon Research Conference*) award to Post-docs by Chair, 17th GRC on Stereochemistry (2008), RI. In Dec. 2009, he joined the Department of Chemistry, IISER Bhopal, where he is currently an Associate Professor. The research focus of the AB research group includes the total synthesis of architecturally interesting biologically active natural products that provide an ideal platform for the invention of new strategies and highly selective organic transformations. A number of naturally occurring architecturally interesting biological relevant secondary metabolites have been synthesized by his research group. He is the recipient of *Young Scientist Research Fellowship* by the BRNS, DAE (2011). He delivered several invited lectures in India and abroad on his research. He was invited for a lead lecture in '*Pfizer Symposium in Organic Chemistry*' in the Department of Organic Chemistry, IISc Bangalore in Jan. 2016. He is currently the *Dean of Faculty Affairs (DoFA)* and *Chief Vigilance Officer (CVO)* at IISER Bhopal.

Course Co-ordinator

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