Manish Mishra et al., Organic Chem Curr Res 2016, 5:3(Suppl)
http://dx.doi.org/10.4172/2161-0401.C1.013

Micellar catalysis for green chemistry: An approach to enhance reaction rate and product selectivity

Manish Mishra[1], Manu Vashishtha[1] and Dinesh O Shah[1,2]
[1]Dharmsinh Desai University, India
[2]University of Florida, USA

Micellar catalysis in aqueous medium has received considerable interest in organic synthesis owing to the fast and selective conversion of substrate into a desired product in water (green solvent) under ambient reaction conditions. In the present work, we demonstrated the potential of micellar catalysis in some industrially important base catalyzed reactions to promote the reactions (conversion rate and selectivity) in water and also to make homogeneous catalysts reusable. The mechanistic aspects of micellar catalysis of the base catalyzed reactions responsible for enhanced reaction rate and high selectivity have been proposed. We proposed that the micelles catalyze the reaction in water by generating a huge interfacial area over reaction time due to a short life-time of micelles (i.e. milliseconds), solubilizing hydrophobic reactants in micelles, concentrating ionic species (e.g., catalytic species like OH- ions) near micellar surface as well as providing specific interactions between reactants and/or reaction intermediates and surfactant molecules. The surfactant structure and nature of the polar group (cationic/anionic/nonionic), chain length, head group size, surfactant concentration, substrate/reactant concentration, substrate structure (hydrophobicity, substituent's effect), inter-molecular cavities in micelles and life time of micelles were observed to strongly influence the micellar catalysis.

Biography

Manish Mishra has obtained his PhD degree in the year 2008 from CSIR-Central Salt and Marine Chemicals Research Institute, Gujarat, India. He is the Head of Chemistry Department and Associated Faculty of Shah-Schulman Center for Surface Science and Nanotechnology in Dharmsinh Desai University, Gujarat, India. His areas of research are material science, heterogeneous catalysis, micellar catalysis and green chemistry. He has published more than 35 papers in reputed journals.

manishorgch@gmail.com

Notes: