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Metal organic frameworks as green catalysts for organic transformations

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Metal organic frameworks (MOF's), also called as porous coordination polymers are porous crystalline materials constituted by nodes of metal ions or metal clusters held in place with rigid bi- or polypodal organic linkers, typically aromatic polycarboxylates. MOFs have received considerable attention in recent years as a new class of porous materials with high specific surface area and pore volume. These properties allow them to be one of the promising materials in gas storage for energy applications, as well as in heterogeneous catalysis. One of the additional advantages in MOFs is the ability to control the specific surface area and pore volume by adjusting the size of the ligands during synthesis. As a consequence, these materials have found many interesting applications in heterogeneous catalysis. MOFs also enjoys the qualification of being in the porous solid family as they can be readily recovered and reused without much loss in the catalytic activity depending on the reaction conditions employed. The presentation will begin with a brief introduction of MOFs, structural characteristics, the role of ligands and various active sites responsible for catalytic reactions. The present lecture will be delivered on the results achieved using MOFs as heterogeneous catalysts in Lewis acid catalysis, aerobic oxidation and others. Further, the results attained with MOFs will be compared with other heterogeneous catalysts like zeolites and homogeneous counterparts. The selected examples will explain how one can conveniently use MOFs as heterogeneous green catalysts in achieving high conversion and selectivity by maintaining their stability. The beneficial advantages of MOFs over other heterogeneous catalysts will also be highlighted.

Biography

Amarajothi Dhakshinamoorthy received his postgraduate degree in Chemistry from Loyola College (Autonomous), Chennai, India, with two gold medals in 2002 and later a PhD degree from Madurai Kamaraj University, India, in 2009. He has worked with Prof. Hermenegildo Garcia as a postdoctoral fellow for four years. Currently, he is working as UGC-Assistant Professor and also serving as a member in the Centre for Green Chemistry Processes at School of Chemistry, Madurai Kamaraj University, Madurai, India. His research interests include developing green and sustainable catalysts using metal-organic frameworks or graphene and its related materials. He has co-authored over sixty papers, two book chapters and holds one international patent.

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