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Porous organic molecular solids for separation

Porous materials are an important class of compounds. Porous materials, such as terracotta, charcoal and dried plant husks, have been used for millennia for filtration and purification. In modern times, porous materials such as zeolites have found extensive use in separation processes such as petrochemical cracking, ion-exchange and the separation and extraction of gases and solvents. Other synthetic porous materials like Metal-Organic-Framework (MOF), Covalent-Organic Framework (COF) have emerged as important materials for separations. Porosity in these materials emerges as extended solids in which the molecular building blocks are linked together by strong covalent bonds. In contrast, porosity in molecular crystal emerges as consequences of either inefficient packing of an awkwardly shaped molecule or the molecule have an intrinsic cavity in the molecule. What set these porous molecules apart from extended frameworks is that they are solution processable and their intrinsic cavity can be engineered. These unique features allow the use of these materials for shape and size selectivity separations. Using this strategy we have demonstrated that we can isolate isomers of organic feed stocks (such as mesitylene and other C-9 isomers, hexane isomers etc.), rare gases, chiral molecules and CO_2 and N_2 for the post-combustion separation process. In this talk, author would focus on selected examples that have been achieved in Liverpool to introduce broader concepts to the audience who are new to this field.

Biography

Tamoghna Mitra has completed his PhD from Universität Bielefeld 2009 on a topic of polyoxometalate cluster and worked with professor Andrew I Cooper on organic porous materials and has published 19 papers in reputed journals on this topic.

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