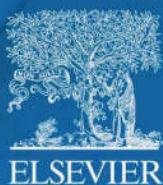
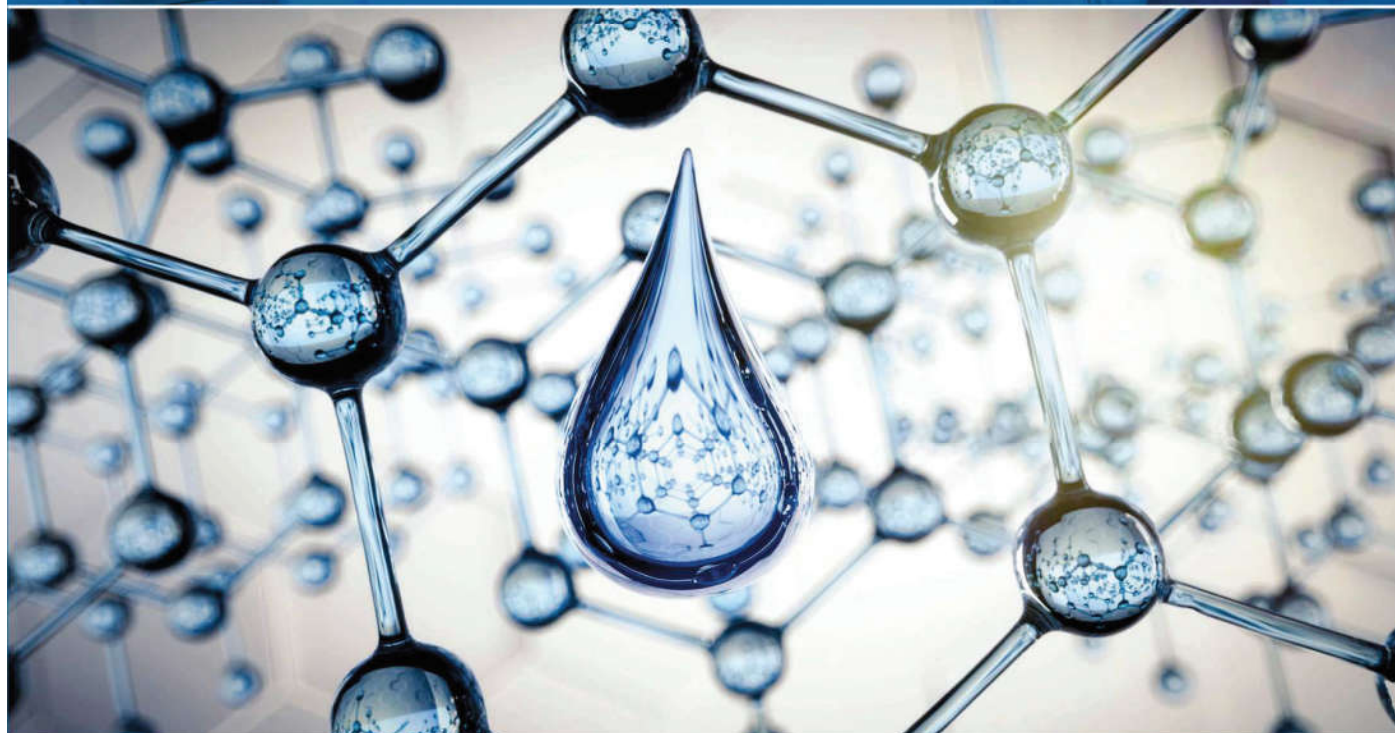


SYNTHESIS OF METAL-ORGANIC FRAMEWORKS VIA WATER-BASED ROUTES

A green and sustainable approach



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Industrial aspects of water-based metal–organic frameworks

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15.1 Introduction

Metal–organic frameworks (MOFs) are porous crystalline solids or porous coordination polymers (PCPs) constructed by metal sites and organic or inorganic building blocks (metal ions or clusters) are some interesting representatives of coordination polymers. During the past several years they have received tremendous research attention from people of different domains due to their high surface area, permanent porosity, controllable morphology, tunable chemical properties, and flexible chemical structure [1]. There is still a major scope in structural optimization of their structure and properties which includes increasing the crystallinity and pore size to enhance their compatibility in accordance with various applications like gas storage, adsorption, and separation, large molecule encapsulation, supercapacitors, energy conversion, chemical sensors, biomedicine, catalysis, etc. Apart from the previously stated their potential applications also include acting as precursors and self-sacrificing templates for synthesizing metal oxides and heteroatom-doped carbons [2]. Hence, awareness and knowledge about MOFs and their potential applications with conceptual understanding are essential to explore and establishing new opportunities for versatile applications and new emerging fields. Albeit, the complete control of the reaction is complicated due to its unusual synthetic procedure. A flexibility in the structural orientation of these privileged structures can be attributed to the presence of a significant number of geometries formed between the metal ions or by incorporating oligo nuclear metal clusters, geometrical characteristics, and also the use of solvent [3].