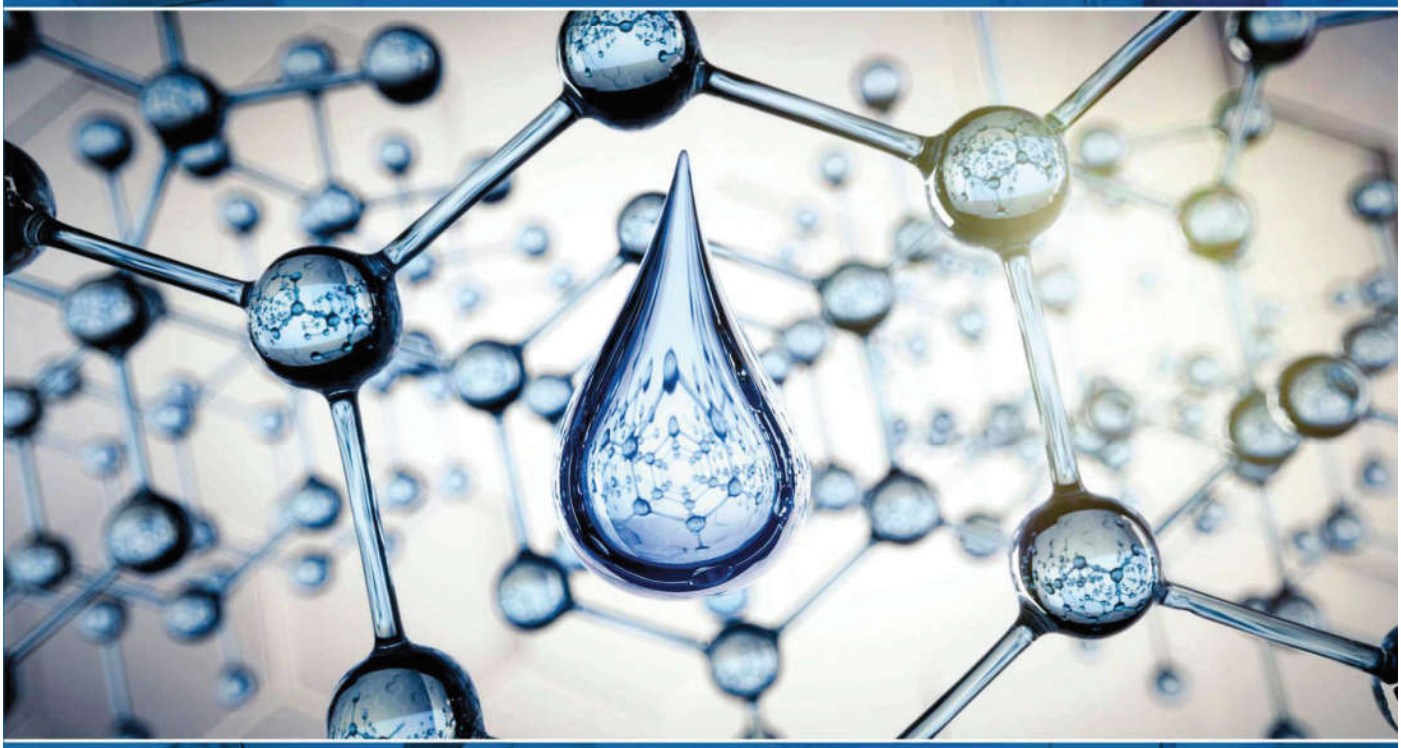
SYNTHESIS OF METAL-ORGANIC FRAMEWORKS VIA WATER-BASED ROUTES

A green and sustainable approach



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Chapter 12

Preparation and applications of water-based coordination pillared-layer

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12.1 Introduction

The possibility of creating a wide range of visually pleasing formations that may also be of considerable relevance for applications across a variety of sectors connected to porous materials has drawn a lot of attention to the development of metal–organic frameworks (MOFs) over the last two decades [1]. This includes more common domains like storing, separation, and catalysis that are influenced by pores size and form as well as host-guest interactions. Additionally, research into biological uses and sensor materials is ongoing. The topic of the biosynthesis of MOFs has been covered in in-depth reviews [2–4]. Coordination pillared layers are unique, systematically structured frameworks with variable pore sizes, geometries, and surface qualities that allow for flexibility [5].

One kind of MOF is pillared-layer structures, and their construction process is regarded as one of the most viable and readily controllable methodologies for constructing 3D porous frameworks [6]. The synthetic process promises to generate a wide range of porosity MOF materials, the architectures of which can be predicted by carefully selecting linker components. Shape organic linkers are utilized to systematically adjust pore size and shape, and functional groups contained in the ligand in columns and/or layers may be introduced into the pore to control their pore surface to get desired features [7,8].

It is also important to consider the usage of green synthesis protocols for the effective and efficient synthesis of these CPL by adhering to green pathways on a sustainable scale, such as by reducing the use of harmful solvents. A new area of study that may point the way to the creation of novel materials with exceptional structures and characteristics is represented by the preparation

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