Metal–organic framework membranes: Production, modification, and applications

Wanbin Li

PII: S0079-6425(18)30092-6
DOI: https://doi.org/10.1016/j.pmatsci.2018.09.003
Reference: JPMS 532

To appear in: *Progress in Materials Science*

Received Date: 13 January 2018
Revised Date: 11 September 2018
Accepted Date: 24 September 2018

Please cite this article as: Li, W., Metal–organic framework membranes: Production, modification, and applications, *Progress in Materials Science* (2018), doi: https://doi.org/10.1016/j.pmatsci.2018.09.003

Metal–organic framework membranes: Production, modification, and applications

Wanbin Li*

School of Environment, and Guangdong Key Laboratory of Environmental Pollution and Health, Jinan University, Guangzhou 511443, P.R.C.

**Corresponding author; e-mail address: gandeylin@126.com*

Abstract

Great developments in the field of metal–organic framework (MOF) membranes have been achieved recently, especially in production with a large membrane area, modification for better performance, and application with additional functions. However, their significance has not been fully recognized and understood. This review summarizes production methodologies, including direct crystallization, interfacial/contra-diffusion synthesis, layer-by-layer assembly, confinement conversion, microfluidic processing, and vapor deposition. The mechanisms and merits of these synthesis methods are analyzed. Modification strategies for the combination of MOFs and introduced components are discussed, and classified into coating, heteroepitaxial growth, embedding, occupation, grafting, and substitution. Modification improves the performance distinctly by changing the construction, microstructure, affinity, and pore size of MOF membranes. The application of MOF membranes in gas separation, nanofiltration, ionic sieving, stimuli responsiveness, and catalysis are reviewed, and the