

Book Review

Nanocomposite Membranes for Water and Gas Separation

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ABSTRACT

There are many membrane technology related books the publication collection, but this book gathered the up to-date knowledge sharing with technology experts around the world on the application of nanocomposite membrane in water and gas separation. This book consists of 510 pages and 19 chapters in this first edition covering the recent progress and development of the novel nanocomposite membrane and the prospect in various application. Each chapter starts with the preliminary introduction of the topics followed by the in-depth discussion and the concluded remarkably.

Chapter 1 and 2 discussed the overview of the nanocomposite membranes in membrane technologies, recent advancement of the materials used and fabrication techniques. Chapter 3 and 5 provide an insight in the selection of polymeric materials, fillers and metal oxides for the fabrication of nanocomposite membrane. This chapter also carefully examined the formation of nanocomposite layers on the membrane by various techniques such as coating, grafting and self-assembly. Chapter 4 overview the heat, mass and charge transfer across the membrane with detailed explanation of the transport phenomenon involved in both porous and non-porous membrane. Chapter 6 to 9 addressed the development of the advanced nanocomposite membranes with detailed discussion on the incorporation of carbon-based nanomaterials (CNTs and GO), molecular sieving nanomaterials (zeolite and MOF), electrospun nanofibrous materials and biomimicking nanomaterials in the nanocomposite membrane. These chapters also discussed the fabrication and coating method of this materials onto the membrane and its effect on both physical and chemical properties of the nanocomposite membranes.

Chapter 10 to 13 described the prospect of the nanocomposite membrane in water treatment by various separation techniques such as pressure-driven membrane processes, osmotic-driven membrane processes, membrane distillation and electrodriven membrane processes. These chapters highlighted the application of nanocomposite membranes with different separation processes in the water treatment application with the discussion on the effects of the operation parameter and the current performance of the membranes in respective processes. Chapter 14 to 17 focussed on the application of nanocomposite membrane in various gas separation in natural gas treatment, nitrogen and oxygen enrichment, recovery of hydrogen and production of syngas and gas separation by membrane contactors. These chapter

summarized the results demonstrated by the membrane in gas separation and the identification of the challenges faced by the nanocomposite membrane. The last two chapters of the book addressed the outlook of the nanocomposite membrane with thorough examination of the operational and environmental challenges faced for the feasibility of commercialization.

This book intended to capture the recent advancement of the nanocomposite membrane in terms of fabrication and its performance in water and gas separation that contributed to the sustainability of membrane technology in the future. More than 50 membrane experts from various countries contributed to this book, providing an insight of nanocomposite membrane which is still inscrutable for many in the separation field. This book will be the vital reference for the researchers, students, membrane technologist, membrane manufacturer or marketeers.

REFERENCE

- [1] M. Sadrzadeh and T. Mohammadi. 2020. *Nanocomposite Membranes for Water and Gas Separation*. Elsevier.