Book Chapter – Handbook of Nanotechnology Applications: Environment, Energy, Agriculture and Medicine 2020, Pages 195 - 218

Development of mixed matrix membranes for gas separations

Abstract

In the last years, development of membrane technology has been gaining interest in the industry due to its simplicity, economical, and environmental benefits. Membrane separation technology has been studied for various industrial applications including air purification and natural gas sweetening. In these processes, membrane technology has proven potential to replace the existing conventional technologies such as absorption, adsorption, and cryogenic distillation. This book chapter describes the development of mixed matrix membranes incorporated with nanofillers and the utilization of them for the gas separation process. It will discuss the factors that affect the membrane separation performance including the selection of polymers and fillers for mixed matrix membranes, the membrane configurations, and the membrane fabrication methods. In addition, the discussion on the effects of different types of nanofillers on the gas separation performance of the mixed matrix membranes will also be provided.

Keywords

Gas separation; Mixed matrix membranes; Nanofillers; Performance