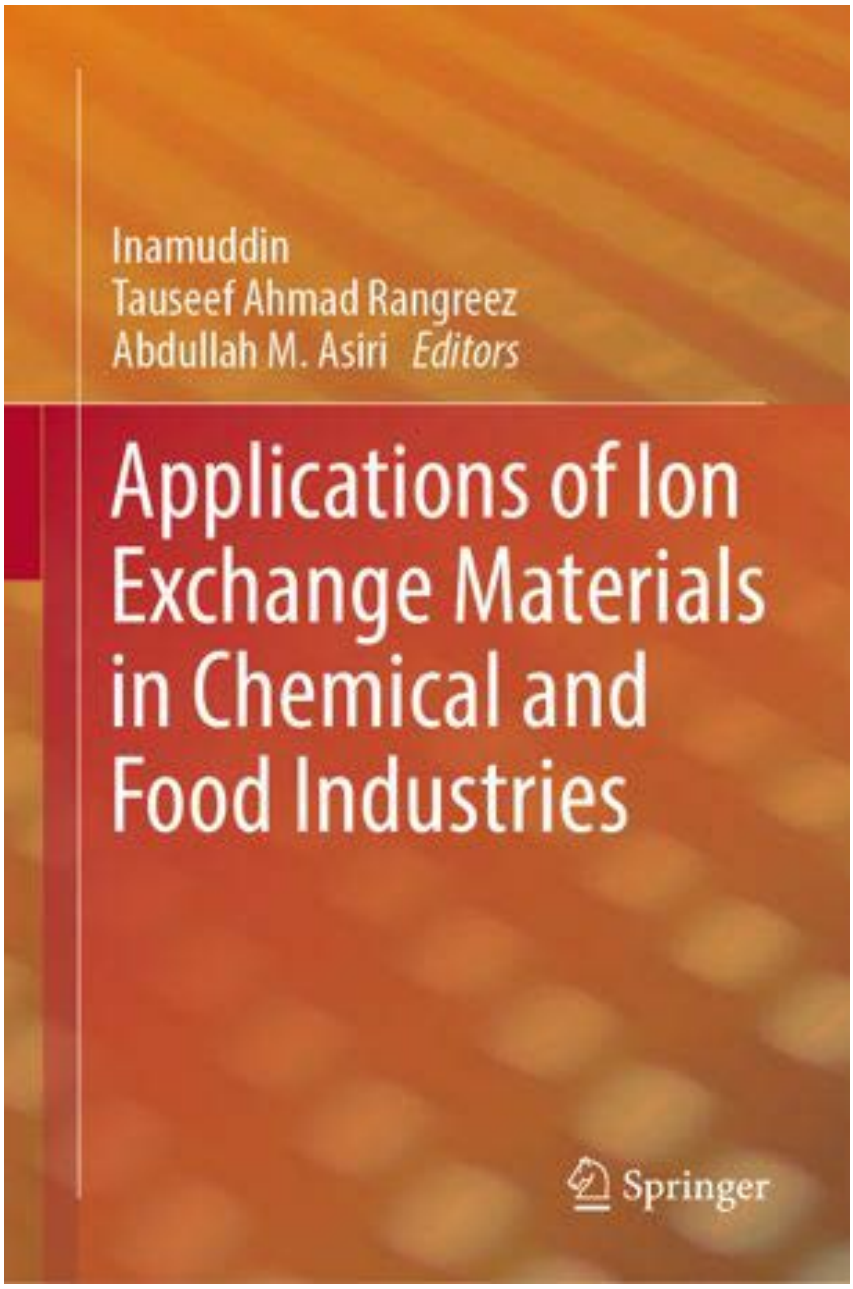

Applications of Ion Exchange Materials in Chemical and Food Industries

Editors: **Inamuddin**, **Rangreez**, Tauseef Ahmad, **Asiri**, Abdullah M. (Eds.)

ISBN 978-3-030-06084-8 ISBN 978-3-030-06085-5 (eBook)
https://doi.org/10.1007/978-3-030-06085-5

Library of Congress Control Number: 2018965904

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Contents

Chapter 2
The Application of Ion-Exchange Resins in Hydrogenation Reactions

Osarieme Uyi Osazuwa and Sumaiya Zainal Abidin

Abstract Reaction processes with minimal energy consumption and potentials to generate renewable energy, alongside dynamism in catalyst functionality, are the driving force behind the use of ion-exchange resins and more specifically, heterogeneous ion-exchange resins over homogeneous catalysts. For hydrogenation reactions, ion-exchange resins have mainly been employed as a catalyst support. The synthesis entails implanting/impregnating metallic ions into the ion-exchange resin matrix. The major disadvantage of the ion-exchange resin is its low thermal stability which makes the resin disadvantageous for some specific types of reactions. Research is still ongoing toward obtaining resins able to withstand extreme temperature (above 200 °C). This chapter summarizes some selected applications of hydrogenation reactions using ion-exchange resins as catalyst support material. Some of its applications include hydrodesulphurization, hydrodenitrification, and hydrodechlorination which have been reviewed in this chapter.

2.1 Introduction

Ion exchange can be defined as a process where mobilized ions obtained from a liquid phase are replaced with ions bound to a functional ion present in a solid. Ion-exchange resin entails the existence of covalent and non-covalent bonds in relation to interactions as a result of ionic and electrostatic relationships between the chemicals [1]. Generally, ion-exchange resins can readily be applied as catalyst sup-

S. Z. Abidin (✉)
Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia
e-mail: sumaiya@ump.edu.my

O. U. Osazuwa
Department of Chemical Engineering, University of Benin, PMB 1154, Benin City, Edo State, Nigeria

S. Z. Abidin
Centre of Excellence for Advanced Research in Fluid Flow (CARIFF), Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia

Inamuddin et al. (eds.), *Applications of Ion Exchange Materials in Chemical and Food Industries*, https://doi.org/10.1007/978-3-030-06085-5_2