

# Green Chemistry and Sustainable Technology

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## **Aims and Scope**

The series *Green Chemistry and Sustainable Technology* aims to present cutting-edge research and important advances in green chemistry, green chemical engineering and sustainable industrial technology. The scope of coverage includes (but is not limited to):

- Environmentally benign chemical synthesis and processes (green catalysis, green solvents and reagents, atom-economy synthetic methods etc.)
- Green chemicals and energy produced from renewable resources (biomass, carbon dioxide etc.)
- Novel materials and technologies for energy production and storage (bio-fuels and bioenergies, hydrogen, fuel cells, solar cells, lithium-ion batteries etc.)
- Green chemical engineering processes (process integration, materials diversity, energy saving, waste minimization, efficient separation processes etc.)
- Green technologies for environmental sustainability (carbon dioxide capture, waste and harmful chemicals treatment, pollution prevention, environmental redemption etc.)

The series *Green Chemistry and Sustainable Technology* is intended to provide an accessible reference resource for postgraduate students, academic researchers and industrial professionals who are interested in green chemistry and technologies for sustainable development.

More information about this series at <http://www.springer.com/series/11661>

Alberto Figoli · Alessandra Criscuoli  
Editors

# Sustainable Membrane Technology for Water and Wastewater Treatment

 Springer

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# Preface

Membrane operations find application in all industrial sectors and have been proved to well compete with conventional production/separation systems. There are already different fields that successfully adopt membrane units, like dialysis, sea and brackish water desalination, and municipal wastewater treatment. However, the need for a sustainable development has imposed new targets to be reached in near future, such as a reduced use of energy and raw materials and lower admissible limits for contaminants discharged into the environment. In this context, the aim of the book is to analyze the sustainability of membrane operations applied at industrial scale, as well as that of those under investigation at lab/pilot scale. It covers not only technical and environmental issues in membrane technology but also economic, regulatory and policy aspects, addressing the challenges for future research in membrane field. The first few chapters of the book deal with sustainability indicators, Life Cycle Assessment (LCA), and process intensification applied to membrane operations. Then, the preparation step of both polymeric and inorganic membranes is presented and discussed, stressing on the possibility of using more sustainable materials, solvents, and processes in the membrane fabrication. As industrial membrane operations, reverse osmosis in desalination, membrane bioreactors for municipal wastewater treatment, and pressure-driven wastewater treatment in agrofood and textile industries are analyzed from a sustainable point of view. Concerning the membrane processes still at a lab/pilot scale, the analysis is made for the: (i) recovery of valuable compounds from wastewater streams, (ii) removal of toxic compounds from water/wastewater, (iii) approaching the zero liquid discharge in desalination.

The book was prepared by leading international researchers (membranologists) having extensive experiences in water and wastewater treatment. We would like to express them our sincere thanks for their contribution and support. We are also very grateful to Prof. Pietro Tundo at Università di Venezia who gave us the possibility of making this book within the series “Green Chemistry and Sustainable

Technology”. Finally, special thanks to Heather Feng and June Tang at Springer Beijing, who assisted us in contacting the authors, preparing, and realizing the final launching of the book.

Rende (CS), Italy

Alberto Figoli  
Alessandra Criscuoli

# Contents

<b>1</b>	<b>Sustainability and How Membrane Technologies in Water Treatment Can Be a Contributor</b> . . . . .	<b>1</b>
	Subhas K. Sikdar and Alessandra Criscuoli	
<b>2</b>	<b>LCA for Membrane Processes</b> . . . . .	<b>23</b>
	António A. Martins, Nídia S. Caetano and Teresa M. Mata	
<b>3</b>	<b>Process Intensification: Definition and Application to Membrane Processes</b> . . . . .	<b>67</b>
	Andrzej Benedykt Koltuniewicz	
<b>4</b>	<b>Sustainable Route in Preparation of Polymeric Membranes</b> . . . . .	<b>97</b>
	A. Figoli, T. Marino, F. Galiano, S.S. Dorraji, E. Di Nicolò and T. He	
<b>5</b>	<b>Inorganic Membranes in Water and Wastewater Treatment</b> . . . . .	<b>121</b>
	Liang-Hsun Chen, Yi-Rui Chen, Che-Yu Chou, Chien-Hua Chen, Chia-Chieh Ko and Kuo-Lun Tung	
<b>6</b>	<b>Desalination by Reverse Osmosis</b> . . . . .	<b>155</b>
	A.J. Karabelas, C.P. Koutsou, D.C. Sioutopoulos, K.V. Plakas and M. Kostoglou	
<b>7</b>	<b>Membrane Distillation in Desalination and Water Treatment</b> . . . . .	<b>201</b>
	Kamalesh K. Sirkar, Dhananjay Singh and Lin Li	
<b>8</b>	<b>Zero Liquid Discharge in Desalination</b> . . . . .	<b>221</b>
	Francesca Macedonio and Enrico Drioli	
<b>9</b>	<b>Removal of Toxic Compounds from Water by Membrane Distillation (Case Study on Arsenic)</b> . . . . .	<b>243</b>
	Alaa Kullab, Andrew R. Martin and Aapo Sääsk	
<b>10</b>	<b>Municipal Wastewater Treatment by Membrane Bioreactors</b> . . . . .	<b>265</b>
	Aymere Awoke Assayie, Abaynesh Yihdego Gebreyohannes and Lidietta Giorno	

<b>11 Valuable Products Recovery from Wastewater in Agrofood by Membrane Processes</b> . . . . .	295
Silvia Álvarez-Blanco, José-Antonio Mendoza-Roca, María-José Corbatón-BÁguena and María-Cinta Vincent-Vela	
<b>12 Membrane Operations for the Recovery of Valuable Metals from Industrial Wastewater.</b> . . . . .	319
Marta Herrero, Eugenio Bringas, María Fresnedo San RomÁN and Inmaculada Ortiz	
<b>13 The Potential of Membrane Technology for Treatment of Textile Wastewater</b> . . . . .	349
Bart Van der Bruggen, Çiğdem BalÇık Canbolat, Jiuyang Lin and Patricia Luis	
<b>Erratum to: Process Intensification: Definition and Application to Membrane Processes</b> . . . . .	E1
Andrzej Benedykt Koltuniewicz	



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