

# Contents

<b>1</b>	<b>Role of Hydrogen in the Energy Sector</b>	<b>1</b>
1.1	Introduction	1
1.2	Hydrogen as an Alternative Fuel	4
1.3	Conclusion	7
	References	8
<b>2</b>	<b>Sodium Hydroxide for Clean Hydrogen Production</b>	<b>11</b>
2.1	Introduction	11
2.1.1	Overview of Sodium Hydroxide (NaOH)	13
2.2	Hydrogen Production	14
2.2.1	Fossil Fuels	14
2.2.2	Biomass	19
2.2.3	Metals	20
2.2.4	Water-Splitting Thermochemical Cycle	21
2.2.5	Organic Compounds	24
2.3	Conclusion	25
	References	26
<b>3</b>	<b>Modified Steam Methane Reformation Methods for Hydrogen Production</b>	<b>31</b>
3.1	Introduction	31
3.2	Steam Methane Reforming Using Non-fossil Energy Sources	32
3.2.1	Nuclear Energy	32
3.2.2	Solar Energy	34
3.3	Steam Methane Reforming Using Fossil Energy Sources	36
3.3.1	Sorption-Enhanced Steam Methane Reforming (SE-SMR)	37
3.3.2	Chemical Looping Steam Methane Reforming (CL-SMR)	40
3.3.3	Hydrogen Membrane Reactor	43

3.4	In Situ CO <sub>2</sub> Capture Using NaOH . . . . .	44
3.5	Conclusion . . . . .	48
	References . . . . .	48
<b>4</b>	<b>Modified Coal Gasification Process for Hydrogen Production . . . . .</b>	<b>55</b>
4.1	Introduction . . . . .	55
4.2	Coal Gasification Using Fossil Energy Sources . . . . .	56
4.2.1	HyPr-RING . . . . .	56
4.2.2	ZECA . . . . .	57
4.2.3	CCR (Carbonation–Calcination Reaction) . . . . .	58
4.2.4	AGC: Advanced Gasification Combustion . . . . .	59
4.3	Coal Gasification Using Non-fossil Energy Sources . . . . .	61
4.3.1	Biomass . . . . .	61
4.3.2	Solar-Driven Gasification . . . . .	62
4.4	In Situ CO <sub>2</sub> Capture Using NaOH . . . . .	62
4.5	Conclusion . . . . .	65
	References . . . . .	65

<http://www.springer.com/978-3-319-14086-5>

Clean Hydrogen Production Methods

Kumar, S.

2015, XII, 66 p. 25 illus., 2 illus. in color., Softcover

ISBN: 978-3-319-14086-5