

Contents

1	Introduction	1
1.1	Research Background	1
1.1.1	Current Situation and Crisis of CSW in China	1
1.1.2	Components and Trend of CSW in China	2
1.1.3	The Disposal Methods of CSW	3
1.1.4	Pollutants from CSW Thermochemical Conversion	5
1.2	The Research Status of Thermochemical Conversion of CSW	6
1.2.1	Overview of CSW Thermochemical Conversion Processes	6
1.2.2	The Research Status of Thermochemical Conversion of CSW Single Components	7
1.2.3	The Research Status of Thermochemical Conversion of CSW Multiple Components	13
1.3	The Research Status of CSW Thermochemical Conversion Reactor	18
1.3.1	Fix Bed Reactor	19
1.3.2	Fluidized Bed Reactor	20
1.3.3	Rotary Kiln Reactor	22
1.4	Summary of Current Research	25
1.5	Research Objectives and Main Content	26
1.5.1	Research Objectives	26
1.5.2	Main Research Content	26
	References	28
2	Research Method	33
2.1	Selection of Basic Components	33
2.1.1	Classification of CSW	33
2.1.2	Selection of Basic Components	39
2.1.3	Basic Characteristics of Basic Components	40

2.2	Experimental System	45
2.2.1	TGA-FTIR	46
2.2.2	Macro-TGA	46
2.2.3	Horizontal Fixed Bed Reactor (HFBR).	54
2.3	Kinetic Analysis Method	58
2.3.1	Kinetic Analysis Method of Slow Pyrolysis	58
2.3.2	Kinetic Analysis Method of Fast Pyrolysis.	59
2.4	Summary	60
	References	60
3	Pyrolysis Characteristics of Basic Components.	63
3.1	Kinetics	63
3.1.1	Kinetics of Pyrolysis in TGA	64
3.1.2	Kinetics of Slow Pyrolysis in Macro-TGA	69
3.1.3	Kinetics of Fast Pyrolysis in Macro-TGA.	72
3.1.4	Comparison of Kinetics at Different Conditions	75
3.2	Gas, Liquid, and Solid Distribution	79
3.3	Gas Production.	80
3.3.1	Gas Production in TGA-FTIR.	80
3.3.2	Gas Production in Horizontal Fixed Bed Reactor Fast Pyrolysis	85
3.4	PAHs Formation	87
3.5	The Pyrolysis and PAHs Generation Mechanisms of Basic Components	90
3.6	Summary	94
	References	95
4	Influential Factors of Thermochemical Conversion of Basic Components	99
4.1	Influence of Temperature	100
4.1.1	Influence of Temperature on Lignin Pyrolysis	100
4.1.2	Influence of Temperature on PVC Pyrolysis.	107
4.2	Influence of Heating Rate.	113
4.2.1	Influence of Heating Rate on Lignin Pyrolysis	114
4.2.2	Influence of Heating Rate on PVC Pyrolysis	116
4.3	Influence of Atmosphere	118
4.3.1	Influence of Atmosphere on Lignin Thermochemical Conversion	118
4.3.2	Influence of Atmosphere on PVC Thermochemical Conversion	125
4.4	Influence of Inorganics.	131
4.4.1	Influence of Inorganics on Lignin Pyrolysis	131
4.4.2	Influence of Inorganics on PVC Pyrolysis	134

4.5	The Mechanisms of Lignin and PVC Pyrolysis and PAHs Formation	137
4.5.1	The Mechanisms of Lignin Pyrolysis and PAHs Formation	137
4.5.2	The Mechanisms of PVC Pyrolysis and PAHs Formation	139
4.6	Summary	140
	References	141
5	Influence of Interactions on the Pyrolytic Characteristics of Basic Components	143
5.1	The Interactions of Lignocellulosic Basic Components	144
5.1.1	Interacted Effects in TGA-FTIR	144
5.1.2	Interacted Effects in Fixed Bed	149
5.2	The Interactions of PVC and Lignocellulosic Basic Components	154
5.2.1	Interacted Effects in TGA-FTIR	154
5.2.2	Interacted Effects in Fixed Bed	157
5.3	Summary	165
	References	166
6	Conclusions and Perspectives	169
6.1	Research Conclusions	170
6.2	Innovative Points	172
6.3	Perspectives	172

Combustible Solid Waste Thermochemical Conversion

A Study of Interactions and Influence Factors

Zhou, H.

2017, XXX, 172 p. 147 illus., 98 illus. in color.,

Hardcover

ISBN: 978-981-10-3826-6