

Contents

Abstract (Chinese)	i
Abstract (English)	ii
Acknowledgements	iii
Table of contents	iv
Figure captions	v
Table list	vi
Chapter 1 Introduction	1
1.1 Overview	1
1.2 Fabrication of microlens arrays	1
1.2.1 Photoresist reflow and etch-transfer	2
1.2.2 Direct laser-writing	3
1.2.3 Laser ablation	3
1.2.4 Grey-scale mask lithography	3
1.3 Organic light-emitting diodes	4
1.3.1 Device structure of PLEDs	6
1.3.2 External quantum efficiency of OLEDs	7
1.3.3 Enhanced light out-coupling efficiency of OLEDs	8
1.4 Organic photovoltaic devices	9
1.5 Motivation and objective of this dissertation	13
1.6 Organization of this dissertation	15
Chapter 2 Experimental methods	16
2.1 Introduction	16
2.2 Fabrication of silicon molds and PDMS stamps	16
2.3 Micro-contact printing	17
2.4 Fabrication of self-assembled microlens arrays	20
2.5 Fabrication of polymer light-emitting diodes	22
2.6 Fabrication of organic photovoltaic devices	22
Chapter 3 Fabrication of self-assembled microlens arrays using hydrophobic effects	24
3.1 Introduction	24
3.2 Surface properties of SAM-treated substrates	24
3.3 Results and discussion	26
3.4 Conclusion	33
Chapter 4 Enhanced light out-coupling efficiency of organic light-emitting diodes using self-organized microlens arrays	34
4.1 Introduction	34
4.2 Proposed methods	35
4.3 Results and discussion	37
4.4 Conclusion	39

Chapter 5	Performance enhancement of polymer light-emitting diodes incorporated with ink-jet printed microlens arrays.....	40
5.1	Introduction.....	40
5.2	Proposed methods.....	41
5.3	Results and discussion.....	42
5.4	Conclusion.....	48
Chapter 6	Conjugated polymer/ PCBM bulk hetero-junction photovoltaic devices under outdoor operating conditions.....	49
6.1	Introduction.....	49
6.2	Results and discussion.....	50
6.3	Enhanced power conversion efficiency of OPV devices using MLAs..	63
6.4	Conclusion.....	65
Chapter 7	Summary and Conclusion.....	66
Reference	70

