## **Table of contents**

List of appreviations	1
Scope and organization of the thesis	3
Chapter 1	6
Introduction	
1.1 Hydrogels	7
1.2 PEG-based hydrogels	8
1.3 Preparation of PEG-based hydrogels	8
1.4 Properties of PEG-based hydrogels	13
1.5 Soft lithographic pattern methods	14
1.6 PEG-based hydrogels applications for tissue engineering	17
1.7 Biomineralization of PEG-based hydrogels for bone tissue engineering	18
1.8 Strategies of HAp generation	19
1.9 Protein immobilization on hydrogels	19
1.10 Nanogels	23
1.11 Electrically conductive hydrogels	24
1.12 References	26
Chapter 2	32
Novel, multifunctional hydrogels synthesized from PEG-based building blo	cks
2.1 Introduction	33
2.2 Materials and Methods	35
2.3 Results and Discussions	47
2.4 Conclusions and Outlooks	54
2.5 References	56
Chapter 3	59

Preparation and characterization of PEG-based nanocomposite hydrogels	
3.1 Introduction	60
3.2 Materials and Methods	63
3.3 Results and Discussions	71
3.4 Conclusions and Outlooks	80
3.5 References	82
Chapter 4	83
Pattern and cell study of PEG/HAp nanocomposite hydrogels	
4.1 Introduction	84
4.2 Materials and Methods	88
4.3 Results and Discussions	92
4.4 Conclusions and Outlooks	99
4.5 References	100
Chapter 5	101
Protein immobilization on PEG-based hydrogels	
5.1 Introduction	102
5.2 Materials and Methods	103
5.3 Results and Discussions	112
5.4 Conclusions and Outlooks	125
5.5 References	127
Summary	128
Abstract	130
Zusammenfassung	131
Acknowledgements	132