

Contents

1	Introduction to Peptide Chemistry and Materials	
	Characterization	1
1.1	Solid-phase Peptide Synthesis	1
1.1.1	The Solid Support	2
1.1.2	Amino Acid Protecting Groups	7
1.1.3	Activation and Coupling	9
1.1.4	Coupling Reagents	9
1.2	Characterization	12
1.2.1	Circular Dichroism (CD) Spectroscopy	12
1.2.2	The Electron Microscope and Electron–Matter Interaction	13
	References	14
2	Biomineralization and the Sequence: Function Effects on the Peptide	19
2.1	Introduction	19
2.1.1	Biomineralization as a Natural Phenomenon	19
2.1.2	Biomineralization as a Synthetic Route Towards Nanomaterial Synthesis	20
2.1.3	Biomineralization Peptide Discovery	22
2.2	Peptide-dependent Factors Influencing Biomineralization	23
2.2.1	Amino Acid Composition and Sequence	23
2.2.2	Conformation	26
2.2.3	Post-translational Modification	27
2.3	Case Study	29
2.3.1	Uncovering Sequence-based Relationships Among Biomineralization Peptides	29
	References	33

3 Synergistic Approaches in Creating Functional Nanomaterials:	
Fusion Peptides and Bimetallic Nanostructures.	37
3.1 Introduction	37
3.2 Structural Control Elements for Biomineralization Peptides.	38
3.2.1 Viruses	38
3.2.2 Peptides and Proteins	39
3.2.3 Small Organic Molecules.	40
3.3 Peptide-mediated Biomineralization of Bimetallic Nanomaterials . . .	41
3.4 Case Study: Controlling the Geometry, Spatial Orientation, and Valency of a Biomineralization Peptide Using the Tetramerization Domain of the Tumor Suppressor p53 Protein.	43
References	50
4 Enhanced Nanomaterials Through Simple Tweaks in the	
Microenvironment.	53
4.1 Introduction	53
4.2 Microenvironment Conditions Affecting Biomineralization	54
4.2.1 Metal Stoichiometry.	54
4.2.2 Reductant	55
4.2.3 pH.	57
4.2.4 Buffer Type.	59
4.3 Case Study	60
4.3.1 Systematic Analysis of the Effects of Buffer on Palladium Biomineralization.	60
References	64

Peptide-Mediated Biomineralization

Janairo, J.I.B.

2016, VIII, 64 p. 7 illus., 4 illus. in color., Softcover

ISBN: 978-981-10-0857-3