

Contents

1	Introduction to Nanozymes.	1
	References.	4
2	Carbon-Based Nanomaterials for Nanozymes	7
2.1	Fullerene and Derivatives	7
2.1.1	Fullerene and Derivatives as Nuclease Mimics	8
2.1.2	Fullerene and Derivatives as SOD Mimics	9
2.1.3	Fullerene Derivatives as Peroxidase Mimics	12
2.2	Graphene and Derivatives.	12
2.2.1	Graphene and Its Derivatives as Peroxidase Mimics	12
2.2.2	Decorated Graphene (or Its Derivatives) as Peroxidase Mimics	15
2.3	Carbon Nanotubes	20
2.3.1	Carbon Nanotubes as Peroxidase Mimics	20
2.3.2	Carbon Nanotubes as Other Enzyme Mimics	22
2.4	Other Carbon-Based Nanomaterials	24
2.4.1	Other Carbon Nanomaterials as Peroxidase Mimics	24
2.4.2	Other Carbon Nanomaterials as SOD Mimics.	24
	References.	25
3	Metal-Based Nanomaterials for Nanozymes	31
3.1	Metal Nanomaterials with Catalytic Monolayers (Type I).	31
3.1.1	AuNPs Protected by Alkanethiol with Catalytic Terminal Moieties	32
3.1.2	AuNPs Protected by Alkanethiol with Non-covalently Assembled Catalytic Moieties	37
3.1.3	AuNPs Protected by Thiolated Biomolecules	39

3.2	Metal Nanomaterials with Intrinsic Enzyme Mimicking Activities (Type II)	40
3.2.1	Metal Nanomaterials as GOx Mimics	40
3.2.2	Metal Nanomaterials as Multiple Enzyme Mimics	41
3.2.3	Applications	45
	References.	49
4	Metal Oxide-Based Nanomaterials for Nanozymes	57
4.1	Cerium Oxide	57
4.1.1	Cerium Oxide as SOD Mimics	58
4.1.2	Cerium Oxide as Catalase Mimics	64
4.1.3	Cerium Oxide as Peroxidase Mimics	66
4.1.4	Cerium Oxide as Oxidase Mimics.	66
4.1.5	Cerium Oxide as Other Mimics	67
4.2	Iron Oxide	68
4.2.1	Iron Oxide as Peroxidase Mimics	68
4.2.2	Iron Oxide as Other Enzyme Mimics	76
4.3	Other Metal Oxides	78
4.3.1	Vanadium Oxide as Enzyme Mimics	78
4.3.2	Cobalt Oxide as Enzyme Mimics	78
4.3.3	Copper Oxide as Enzyme Mimics.	81
4.3.4	MoO ₃ , TiO ₂ , MnO ₂ , RuO ₂ as Enzyme Mimics.	81
	References.	82
5	Other Nanomaterials for Nanozymes	93
5.1	Prussian Blue	93
5.2	Metal-Organic Frameworks.	95
5.3	Metal Chalcogenides.	97
5.4	Metal Hydroxides.	97
5.5	Miscellaneous	98
	References.	98
6	Challenges and Perspectives	103
	References.	105
	Appendix	109