

Contents

1	Introduction	1
2	Combustion Synthesis	11
2.1	Nanopowder Synthesis	12
2.2	Combustion Parameters	14
2.2.1	Flame Types	14
2.2.2	Characteristic Temperatures	15
2.2.3	Gas Generation	16
2.2.4	Atmosphere	17
2.2.5	Fuel-Oxidant Ratio	17
2.2.6	Chemical Composition of Precursor Chemicals	18
2.3	Fuels	19
2.4	Oxidants	19
	References	20
3	Spray Pyrolysis	23
3.1	Introduction	23
3.2	Spray-Pyrolysis Technique	24
3.2.1	Atomization of Precursor Solution	26
3.2.2	Aerosol Transportation	26
3.2.3	Decomposition of the Precursor	27
3.2.4	Influence of Spray Parameters on the Morphology of the Film	29
	References	29
4	Electrospinning	31
4.1	The Electrospinning Technique	31
4.1.1	Jet Formation	34
4.1.2	Factors Influencing Fiber Characteristics	38
4.2	Electrospinning of Ceramic Fibers	40
	References	41

5	CCVD Synthesis of Carbon Nanotubes	43
5.1	Carbon and Its Allotropes	44
5.2	Carbon Nanotubes	46
5.2.1	Carbon Nanotubes Properties	47
5.3	Carbon Nanotubes Synthesis	49
5.3.1	High Temperatures Methods	49
5.3.2	CCVD	50
	References	56
6	Hydrothermal Synthesis	61
6.1	Introduction	61
6.2	Application	62
6.2.1	Hydrothermal Synthesis of Al_2O_3	65
6.2.2	Hydrothermal Synthesis of Zinc Oxide	67
6.2.3	Titanium Oxide	69
	References	74
7	High-Energy Milling	77
7.1	The High-Energy Milling Process	78
7.2	Application of HEBM for Nanoparticle Production	81
7.2.1	Nanotubes and Nanowires	81
7.2.2	Ceramic Powders	82
7.2.3	Intermetallics	83
	References	84