

Contents

1	Introduction	1
	References.....	2
2	Piezoelectricity and Ferroelectricity	3
2.1	Background.....	3
2.2	Polarisation	4
2.3	Ferroelectricity	6
2.3.1	Phase Transition.....	8
2.3.2	Spontaneous Polarisation.....	8
2.3.3	Measurements	9
2.3.4	Size Influences on Ferroelectric Behaviour	10
2.3.5	Ferroelastic Behaviour	11
2.4	Semiconductor Materials	12
2.4.1	Intrinsic and Extrinsic Properties.....	13
2.5	Ferroelectric and Piezoelectric Materials as Semiconductors	15
	References.....	16
3	Nanostructured Materials	19
3.1	Synthesis	19
3.1.1	ZnO Nanostructures	20
3.1.2	Lead Zirconate Titanate and Barium Titanate.....	23
3.2	Device Architectures	23
3.2.1	Early Investigation: Single Nanowire Testing.....	24
3.2.2	Nanowire Arrays	25
3.2.3	The Introduction of Flexibility.....	27
3.2.4	Alternative Materials.....	32
3.2.5	The Significance of Screening	36
3.2.6	Applications	39
3.3	Testing and Performance.....	42
3.3.1	Mechanical Input: Methods and Characterisation of Device Straining	43

3.3.2 Measurement of Nanogenerator Output.....	45
3.3.3 Electrical Characterisation	48
3.4 Future Prospects.....	50
References.....	51
Index.....	57

Nanostructured Piezoelectric Energy Harvesters

Briscoe, J.; Dunn, S.

2014, VIII, 58 p. 22 illus., 9 illus. in color., Softcover

ISBN: 978-3-319-09631-5