

CONTENTS

	Page
Acknowledgement	c
Abstract in English	e
Abstract in Thai	h
List of Tables	k
List of Figures	o
List of Abbreviations/Symbols	x
Statement of Originality in English	y
Statement of Originality in Thai	z
Chapter 1 Introduction	
1.1 Overview	1
1.2 Objectives of this work	3
Chapter 2 Literature reviews	
2.1 Dielectric properties	4
2.1.1 Dielectric permittivity	4
2.1.2 Dielectric loss	5
2.1.3 Frequency dependence of dielectric polarization	7
2.2 Ferroelectric properties	9
2.2.1 Ferroelectric phases and domains	9
2.2.2 Polarization switching and hysteresis loop	10
2.3 Relaxor	11
2.4 Lead-free perovskite materials	17
2.4.1 Barium calcium zirconate titanate ((1-x)BCT- xBZT)	

2.5 Different powder preparation	18
Chapter 3 Materials and methods	31
3.1 Sample preparation	
3.1.1 Powder preparation	36
3.1.2 Ceramic preparation	36
3.1.2.1 BCZT system	36
3.1.2.2 BCZT-xBi system	38
3.1.2.3 BCZT-0.02Bi-xPMNT system	40
3.2 Sample Characterization	42
3.2.1 Thermal analysis	43
3.2.2 Raman spectra analysis	44
3.2.3 Fourier transform infrared spectroscopic analysis	44
3.2.4 X-ray diffractometry	45
3.2.5 Crystal structure	45
3.2.6 Physical property measurement	47
3.2.7 Microstructure analysis	47
3.2.8 Dielectric property analysis	48
3.2.9 Ferroelectric property analysis	51
Chapter 4 Results and discussion (part I): Preparation and characterization of BCZT system	53
4.1 BCZT powder preparation	
4.1.1 Thermal analysis	54
4.1.2 Structure and phase evolution	54
4.1.3 Microstructure	55
4.1.4 Crystal structure	59
4.2 BCZT ceramic preparation	62
4.2.1 Structure and crystal structure	64
4.2.2 Microstructure and physical properties	64
4.2.3 Dielectric properties	64

4.2.4 Ferroelectric properties	65
4.2.5 Electrostrictive properties	68
Chapter 5 Results and discussion (part II) : Effect of Bi_2O_3 addition on	69
properties BCZT ceramics and effect of PMNT single crystal on properties of	71
BCZT-xBi ceramics	73
5.1 Powder characterization of BCZT-xBi	73
5.2 Microstructure of BCZT-xBi ceramics	74
5.3 Physical properties of BCZT-xBi	77
5.4 Dielectric properties of BCZT-xBi	78
5.5 Ferroelectric properties of BCZT-xBi	79
5.6 Structure and crystal structure of BCZT-0.02Bi-xPMNT	80
5.7 Optical microscope, microstructure and chemical composition of	83
BCZT-0.02Bi-xPMNT	
5.8 Dielectric properties of BCZT-0.02Bi-xPMNT	86
5.9 Relaxor ferroelectric properties	89
5.10 Ferroelectric properties of BCZT-0.02Bi-xPMNT	97
Chapter 6 Conclusions and suggestions	
6.1 General conclusions	100
6.2 Suggestion for future work	101
References	103
VITA	111

LIST OF TABLES

	Page
Table 3.1 Specifications of the materials used in this work	37
Table 4.1 Comparative average grain sizes obtained from XRD, SEM and TEM results of the BCZT powders with different pH values of 5, 7 and 9, respectively.	62
Table 4.2 Crystal structure data of BCZT calcined powder at 900 °C with pH7.	63
Table 5.1 Chemical composition of selected the BCZT-0.02Bi ceramic sintered at 1200 °C for 2 h.	77
Table 5.2 Curie-Weiss parameters of the BCZT-0.02Bi-xPMNT composite ceramics.	90
Table 5.3 Quadratic fitting parameters of the BCZT-0.02Bi-xPMNT ceramics.	93
Table 5.4 V-F fitting parameters of the BCZT-0.02Bi-xPMNT composite ceramics.	96

LIST OF FIGURES

	Page
Figure 2.1 Modified phasor diagram of (a) a perfect capacitor and (b) a real capacitor	5
Figure 2.2 Phasor diagram showing “lossless” (capacitive) and “lossy” components of total current I	7
Figure 2.3 Frequency dependences of real and imaginary parts of dielectric for each polarization process	8
Figure 2.4 Polarization processes with unpolarized and polarized state	8
Figure 2.5 Unit cells and the Ti displacement in four BaTiO ₃ phases (a) cubic, (b) tetragonal, (c) orthorhombic, and (d) rhombohedral. Arrows indicate the spontaneous polarization (P_s) orientations in each phase	9
Figure 2.6 A schematic illustration of ferroelectric domains having 90° and 180° orientations in a tetragonal ferroelectric perovskite	10
Figure 2.7 A typical P - E hysteresis loop in ferroelectric materials	11
Figure 2.8 Hysteresis loop for a lossy capacitor	11
Figure 2.9 Dielectric permittivity as a function of temperature and frequency for relaxor ferroelectric material.	12
Figure 2.10 Local spontaneous polarization P as shown by thick arrows caused by the correlated displacement of ion inside PNRs, in a unit cell of the lead complex perovskite relaxor. Small arrows present typical uncorrelated ion displacements	14

Figure 2.11 Schematic representation of the soft polar nanoregion model discovered by Bokov and Ye for compositionally disordered $A(B'B'')O_3$ perovskites. A and O ions are not shown. One-way and two-way small arrows represent spontaneous dipole moments of fixed cells and free cells, respectively. Large arrows represent the polarization of the individual PNRs	15
Figure 2.12 Schematic representation of temperature evolutions of the structure and dielectric properties in compositionally disordered perovskite. There are three types of structures i.e. paraelectric (PE), ergodic relaxor (ER) and nonergodic relaxor (NR). When the temperature is higher than T_B , the Curie-Weiss (CW) law applies. For the temperature lower than T_B to T_{max} , the Quadratic law can be used. As the temperature decreases to lower than T_f , the behavior follows by Vogel-Fulcher law. The regions of conventional relaxor dispersion (CRD) and universal relaxor dispersion (URD) are identified	16
Figure 2.13 (a) Phase diagram of pseudobinary ferroelectric $Ba(Zr_{0.2}Ti_{0.8})O_3-x(Ba_{0.7}Ca_{0.3})TiO_3$ or BZT- x BCT system (b)-(d) the temperature dependence of dielectric permittivity of 80BZT-20BCT, 50BZT-50BCT and 10BZT-90BCZT, respectively	19
Figure 2.14 Modified phase diagram of pseudobinary ferroelectric $Ba(Zr_{0.2}Ti_{0.8})O_3-x(Ba_{0.7}Ca_{0.3})TiO_3$ or BZT- x BCT system	19
Figure 2.15 Dielectric properties as a function of sintering temperature (a) dielectric permittivity and (b) dielectric loss of BCT-BZT ceramics	20
Figure 2.16 Refinement of the XRD pattern of BCZT ceramic sintered at 1500°C	21
Figure 2.17 Dielectric properties as a function of temperature and frequencies (a) dielectric permittivity and (b) dielectric loss of BCZT ceramic sintered at 1500°C	21

Figure 2.18 Temperature dependence of dielectric permittivity of BCZT ceramics with various dwell times during sintering and Curie temperature versus dwell time	22
Figure 2.19 Hysteresis loops (left) and $2P_r$ and $2E_c$ of BCZT ceramics with various dwell times	22
Figure 2.20 SEM images of BCZT ceramics with various ZnO additions where (a) 0 mole% (b) 0.02 mole% (c) 0.06 mole% and (d) 0.10 mole%, respectively	23
Figure 2.21 $2P_r$ and $2E_c$ with difference of ZnO additions in BCZT ceramics	23
Figure 2.22 Dielectric properties of BCZT- x CuO ceramics	24
Figure 2.23 SEM micrographs of the BCZT- x Y ₂ O ₃ ceramics	25
Figure 2.24 Temperature dependence of dielectric permittivity for the BCZT- x Y ₂ O ₃ ceramics	25
Figure 2.25 XRD patterns of (Ba _{0.85} C _{0.15-2x} Bi _{2x})(Zr _{0.1} Ti _{0.9-x} Cu _x)O ₃ ceramic (a) $2\theta = 20^\circ$ - 80° and (b) $2\theta = 44^\circ$ - 47°	26
Figure 2.26 Dielectric properties and the plot of $\ln(1/\varepsilon - 1/\varepsilon_m)$ versus $\ln(T-T_m)$ of (Ba _{0.85} C _{0.15-2x} Bi _{2x})(Zr _{0.1} Ti _{0.9-x} Cu _x)O ₃ ceramic	26
Figure 2.27 Rietveld refinement of XRD patterns for BCZT- x Pr (a) $x=0.02$ wt% and (b) $x=0.08$ wt%	27
Figure 2.28 Temperature dependence of dielectric permittivity of BCZT- x Pr ceramics	28
Figure 2.29 XRD patterns for BCZT- x Bi ceramics	29
Figure 2.30 SEM images for BCZT x Bi ceramics with (a) $x = 0$, (b) $x = 0.1$ and (c) $x = 1$, respectively	29
Figure 2.31 Temperature dependence of dielectric permittivity for BCZT- x Bi ceramics with (a) $x = 0$, (b) $x = 0.1$, (c) $x = 0.5$ and (d) $x = 1$, respectively	30
Figure 2.32 Hysteresis loops for BCZT- x Bi ceramics	31
Figure 2.33 FTIR patterns of BCZT gel and powder at different calcination temperatures	32

Figure 2.34 XRD patterns of BCZT gel and powder at different calcination temperatures	32
Figure 2.35 Raman patterns of BCZT gel, powder at different calcination temperatures and BaTiO ₃ powder calcined at 700°C	33
Figure 2.36 XRD patterns of BCZT powder calcined at different temperatures and enlarge peak at (200) and (202)	34
Figure 2.37 FTIR spectra of BCZT powder at various calcination temperatures	34
Figure 2.38 TEM image and selected area electron diffraction pattern of BCZT powder calcined at 700°C	35
Figure 2.39 Raman spectra of the BCZT powder calcined at 700 °C	35
Figure 3.1 Diagram of the calcination process for Ba _{0.85} Ca _{0.15} Zr _{0.1} Ti _{0.9} O ₃ powder at various temperatures.	37
Figure 3.2 Preparation diagram for BCZT powders derived by sol-gel auto combustion.	38
Figure 3.3 The pellet arrangement for the sintering process: (a) top view and (b) side view.	39
Figure 3.4 Diagram of sintering process of Ba _{0.85} Ca _{0.15} Zr _{0.1} Ti _{0.9} O ₃ ceramic at various temperatures.	39
Figure 3.5 Diagram for BCZT ceramic preparation at various temperatures	40
Figure 3.6 Diagram of sintering process of Ba _{0.85} Ca _{0.15} Zr _{0.1} Ti _{0.9} O ₃ -xBi ₂ O ₃ ceramic at various temperatures	41
Figure 3.7 Preparation diagram for Ba _{0.85} Ca _{0.15} Zr _{0.1} Ti _{0.9} O ₃ -xBi ₂ O ₃ ceramic at various temperatures	41
Figure 3.8 Diagram of sintering process of Ba _{0.85} Ca _{0.15} Zr _{0.1} Ti _{0.9} O ₃ -0.02Bi ₂ O ₃ ceramic at 1200°C with different sintering times	42
Figure 3.9 Schematic diagram of BCZT-0.02Bi-xPMNT sample preparation.	42
Figure 3.10 Diagram of sintering process of BCZT-0.02Bi-xPMNT ceramics.	43

Figure 3.11 Processing for the preparation of BCZT-0.02Bi-xPMNT ceramics.	43
Figure 3.12 Differential Scanning Calorimeter	44
Figure 3.13 Raman spectrometer	45
Figure 3.14 Fourier transform infrared spectrometer.	45
Figure 3.15 X-ray diffractometer	46
Figure 3.16 Schematic diagram of Bragg's law reflection	46
Figure 3.17 Feature of Powder Cell program with all refined parameters, crystal structure and simulated pattern.	47
Figure 3.18 Schematic illustration of the incident electron beam interaction into the material	49
Figure 3.18 Scanning electron microscope (SEM, JEOL JSM-6335F)	49
Figure 3.19 Scanning electron microscope (JSM-IT300LV).	50
Figure 3.20 Sputter coater (JFC-1100E)	50
Figure 3.21 Transmission electron microscope (TEM, JEOL JSM-2010)	51
Figure 3.21 Alpha high resolution dielectric/impedance analyzer (NovoControl) or Solartron 1260 impedance analyzer combined with a Solartron 1296 dielectric interface	52
Figure 3.22 A modified Sawyer-Tower circuit for the measurement of ferroelectric	52
Figure 3.23 A Radiant RT-66 standardized ferroelectric testing system	
Figure 3.24 The electric field induced strain measurement (S-E loop) obtained by linear variable differential transformer (OMRON, ZX-TDS01T)	53
Figure 4.1 The thermal behavior of an as-burnt powder with various calcination temperatures.	55
Figure 4.2 XRD patterns of BCZT as-burnt and calcined powder with various pH values.	56
Figure 4.3 Raman spectrums of BCZT as-burnt, BCZT calcined and BaTiO ₃ powder.	57

Figure 4.4 Fourier transform infrared spectra of BCZT as-burnt powder with different pH values (a) pH5 (b) pH7 (c) pH9 and calcined powder with various pH values of (d) pH5 (e) pH7 (f) pH 9 and (g) BaTiO ₃ powder.	59
Figure 4.5 SEM (1) and TEM (2) micrographs of BCZT calcined powder with various pH values of (a) pH5, (b) pH7 and (c) pH9.	60
Figure 4.6 TEM images (1) and SAED patterns (2) of BCZT calcined powder with various pH values of (a) pH5, (b) pH7 and (c) pH9.	61
Figure 4.14 P-E loops of BCZT ceramics sintered at various temperatures.	70
Figure 4.15 The plot of P_r and E_c of BCZT ceramics sintered at various temperatures.	71
Figure 4.16 The plot of Strain (S) - Electric field (E) of BCZT ceramics sintered at various temperatures.	72
Figure 5.1 XRD patterns of BCZT-xBi ceramics sintered at 1200°C.	74
Figure 5.2 SEM micrographs of the BCZT-xBi ceramics sintered at 1200°C for 2 h.	75
Figure 5.3 WDS point images of the BCZT-0.02Bi sintered at 1200°C for 2 h where area 1 (a) spectrum 1 (b) spectrum 2 (c) spectrum 3 and area 2 (d) spectrum 1 (e) spectrum 2 (f) spectrum 3.	76
Figure 5.4 WDS mapping of the BCZT-0.02Bi sintered at 1200°C for 2 h.	76
Figure 5.5 Physical properties of the BCZT-xBi ceramics sintered at 1200°C for 2 h.	78
Figure 5.6 Dielectric properties of the BCZT-xBi ceramics sintered at 1200°C for 2 h.	79
Figure 5.7 P-E loops of the BCZT-xBi ceramics sintered at 1200°C for 2 h.	80
Figure 5.8 XRD patterns of BCZT-0.02Bi, 1PMNT, 3PMNT, 5PMNT ceramics and PMNT crystal.	81
Figure 5.9 Fitting result of BCZT-0.02Bi, 1PMNT, 3PMNT and 5PMNT ceramics by Powder Cell Software.	82
Figure 5.10 OM images of polished surface of the BCZT-0.02Bi-xPMNT composite ceramics: (a) 1PMNT, (b) 3PMNT, and (c)	83

5PMNT. Schematic of the observed PMNT crystal shapes due to polishing: (d) triangle, and (e) rectangle.	
Figure 5.11 SEM images of the BCZT-0.02Bi- <i>x</i> PMNT composite ceramics of (a) 1PMNT (b) 3PMNT and (c) 5PMNT.	84
Figure 5.12 SEM image, EDX spectra and elemental analysis of the 3PMNT ceramic composite.	84
Figure 5.13 SEM images and elemental analysis by WDS for 1PMNT, 3PMNT and 5PMNT.	86
Figure 5.14 Temperature dependences of the dielectric permittivity (ϵ_r) and dielectric loss ($\tan \delta$) of BCZT-0.02Bi- <i>x</i> PMNT when $x = 0, 1, 3$ and 5 wt% PMNT single crystals (a - d), and those of a PMNT crystal (e). Fitting results of the broad dielectric peaks at 1 kHz.	88
Figure 5.15 Dielectric properties of the BCZT-0.02Bi- <i>x</i> PMNT composite ceramics with different concentrations of PMNT crystals measured at 1 kHz.	89
Figure 5.16 The modified of Curie-Weiss law for the BCZT-0.02Bi- <i>x</i> PMNT composite ceramics and PMNT crystal.	90
Figure 5.17 Plots of T_B , T_m and T_{CW} as a function of PMNT content of the BCZT-0.02Bi- <i>x</i> PMNT composite ceramics.	91
Figure 5.18 Quadratic fitting curves of (a) BCZT-0.02Bi and the ceramics added with (b) 1PMNT (c) 3PMNT (d) 5PMNT of the BCZT-0.02Bi- <i>x</i> PMNT composite ceramics and (e) PMNT crystal. Dot-black line and dot-red curves are belonged to an experimental data and the data investigated from a quadratic equation, respectively.	92
Figure 5.19 Plots of fitting parameters of ϵ_A , T_A and diffuseness parameters of the BCZT-0.02Bi- <i>x</i> PMNT composite ceramics as a function of PMNT content of PMNT content.	93
Figure 5.20 V - F fitting curves of (a) BCZT-0.02Bi ceramic and the ceramics added with (b) 1PMNT (c) 3PMNT (d) 5PMNT of the	95

BCZT-0.02Bi-xPMNT composite ceramics and (e) PMNT crystal. Dot-pink line and solid-black curves are belonged to an experimental data and the data investigated from V - F equation, respectively.

Figure 5.21 Plots of fitting parameters of E_a , f_0 and T_{VF} of the BCZT-0.02Bi-xPMNT composite ceramics as a function of PMNT content. 96

Figure 5.21 Plots of T_B and T_{VF} as a function of PMNT content of the BCZT-0.02Bi-xPMNT composite ceramics. A temperature range above T_B (red-line) is belonged to a paraelectric state while lower temperature than T_B is presented an ergodic relaxor state. The lower than T_{VF} (black-line) is presented a glassy state. 97

Figure 5.22 P-E loops of BCZT-0.02Bi-xPMNT displayed at difference temperatures: (a) 25 °C, (b) 0 °C, (c) -50 °C, and (d) -100 °C. 99

STATEMENT OF ORIGINALITY

1. A new method, so-called sol-gel auto combustion, for the synthesis of barium calcium zirconate titanate ceramics based on the concepts of reducing energy use and production of high-quality nano-sized powder is proposed in this thesis.
2. The improvement in physical and dielectric properties of barium calcium zirconate titanate based-ceramics by the addition of bismuth oxide powder is proposed in this thesis.
3. In order to improve the dielectric properties of barium calcium zirconate titanate based-ceramics, the addition of lead magnesium niobate titanate crystals is proposed in this thesis.
4. The microstructure design of the new composite material is proposed in this thesis and its properties are compared to those of commercial products in order to assess the possibility of its use in real applications.

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ข้อความแห่งการริเริ่ม

1. วิทยานิพนธ์นี้ได้นำเสนอวิธีการใหม่โดยเลือกวิธีโซลเจลออกโตคอมบัสชั่น เพื่อการสังเคราะห์ผงแบเรียมแคลเซียมเซอร์โคเนตไททานेट บนพื้นฐานของความคิดเพื่อการลดพลังงานความร้อน และปรับปรุงคุณภาพสูงขึ้น
2. เพื่อการเพิ่มประสิทธิภาพของสมบัติทางกายภาพและสมบัติไดอิเล็กทริกในเซรามิกแบเรียมแคลเซียมเซอร์โคเนตไททานेटโดยการเติมผงบิสมาท์ได้นำเสนอในงานวิจัยวิทยานิพนธ์นี้
3. เพื่อเพิ่มประสิทธิภาพของสมบัติไดอิเล็กทริกโดยการเติมผลึกแบเรียมแคลเซียมเซอร์โคเนตไททานेटโดยการเติมผลึกเลดแมกนีเซียมไนโอเบตไททานेटได้นำเสนอในวิทยานิพนธ์นี้
4. การออกแบบโครงสร้างจุลภาคของวัสดุชนิดใหม่ได้นำเสนอในวิทยานิพนธ์นี้ และเปรียบเทียบวัสดุจากวิทยานิพนธ์นี้กับผลิตภัณฑ์ทางการค้าสำหรับแนวทางเพื่อเป็นประโยชน์ในการประยุกต์ใช้จริง

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