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Ferroelectrics and related substances

Subvolume A1: Oxides

Perovskite-type oxides and LiNbO₃ family

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IF Survey of contained data

Each chapter of this volume corresponds to one family consisting of similar substances. This Subvolume A contains nineteen oxide families and thus nineteen chapters, as listed in table of contents. Each section in a chapter is devoted to describing properties of one substance (pure compound or solid solution). Table IF-1 shows how the data are presented in each section: The section is divided into 16 subsections and each subsection gives the data on special properties (e.g., dielectric properties). The information given in each section is surveyed by a table at the beginning of the section according to the order of subsections 1...16 of Table IF-1.

A detailed two-dimensional survey of contained data is made in Table IF-2 which gives all the substances appearing in this Subvolume along the ordinate and properties along the abscissa.

Table IF-1. Arrangement of data for each substance

Subsection	Information
1	History and fundamental quantities.
a	History (discoverer, year of discovery).
b	Fundamental quantities (phases, state (F, A, P), crystal system, space group of each phase, transition temperatures, direction of spontaneous polarization, melting point, density, transparency and color, cleavage plane, deliquescence and efflorescence, phase diagram for solid solution).
2	Material preparation and crystal growth.
a	Method, solubility in fluxes or solvents.
b	Crystal forms, <i>a</i> , <i>b</i> , <i>c</i> axes, <i>X</i> , <i>Y</i> , <i>Z</i> axes.
3	Crystal structure.
a	Unit cell parameters.
b	Crystal structure (<i>Z</i> , table of positional and temperature parameters, interatomic distances and bond angles, figure of crystal structures, structural change associated with phase transitions).
4	Lattice distortions (thermal expansion, lattice deformation associated with spontaneous polarization).
5	Dielectric properties.
a	Dielectric constants (κ vs. <i>T</i> , Curie-Weiss law constants, κ vs. <i>p</i> , κ vs. two- or one-dimensional pressure, κ vs. frequency, phase diagram in regard to <i>p</i> and E_{bias}).
b	Nonlinear dielectric properties (effect of E_{bias} on κ ; values of ξ and ζ).
c	Spontaneous polarization and coercive field (or critical field for antiferroelectrics).
d	Pyroelectric and electrocaloric effect.
6	Thermal properties.
a	Heat capacity, transition heat, transition entropy.
b	Thermal conductivity.
7	Electromechanical properties.
a	Piezoelectricity.
b	Electrostriction.
c	Nonlinear electromechanical properties.

(continued)

Table IF-1. (continued)

8	Elastic properties.
a	Elastic compliances and stiffnesses (including data on acoustic surface wave).
b	Nonlinear elastic properties.
9	Optical properties.
a	Refractive indices, birefringence, reflection, absorption (infrared region, visible region, ultraviolet region).
b	Electrooptic effect.
c	Piezooptic effect (photoelastic effect).
d	Optical activity (rotatory power), Faraday effect.
e	Nonlinear optical properties.
10	Properties studied by light scattering.
a	Raman scattering.
b	Brillouin scattering and Rayleigh scattering (Elastic constants are given in 8a).
11	Electrical conduction (conductivity, breakdown strength, thermoelectric effect, photoconductivity and photoemission, superconductivity, band structure).
12	Magnetic properties (magnetic susceptibility, spontaneous magnetization, magnetic structure, magnetoelectric effect).
13	Properties studied by magnetic resonance and Mössbauer effect.
a	NMR.
b	ESR and ENDOR.
c	Mössbauer effect.
14	Diffraction phenomena related with secondary structures and local structures.
a	Bragg reflections due to structural modulations.
b	Diffuse or inelastic scattering.
c	EXAFS.
15	Domains.
a	Domain structure.
b	Effects of electric field and mechanical stress.
16	Miscellanea (thin layer, surface layer, radiation damage, plasticity, dislocation, etchant, point defects, twin structure, stripe pattern, paraelectric resonance).

Table IF-2. Two-dimensional survey of contained data

This table indicates the pages where the required data for special properties and individual substances can be found. All the substances appearing in subvolumes III/36A1 and III/36A2 are given along the ordinate and properties along the abscissa. Detailed items of the property columns 1...16 on the abscissa can be found in Table IF-1. Abbreviations in this table: [F]: ferroelectric. [(F)]: possibility of ferroelectricity. [A]: antiferro-electric. [(A)]: possibility of antiferroelectricity.

All substances in chapters 1 (Perovskite-type oxides) and 2 (LiNbO₃ family) are included in this sub-volume III/36A1, chapters 3...19 and M are included in subvolume III/36A2.

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
1 Perovskite-type oxides																		
1A Simple perovskite-type oxides																		
1	NaNbO ₃ [(F), A]	1A-1	•	•	•	•	•				•		•		•	•	•	
2	KNbO ₃ [F]	1A-2	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
3	AgNbO ₃ [F]	1A-3	•			•	•	•				•					•	
4	NaTaO ₃	1A-4	•		•	•							•		•			•
5	KTaO ₃	1A-5	•	•	•	•	•	•	•	•	•	•	•		•	•		•
6	AgTaO ₃	1A-6	•		•	•	•					•						
7	CaTiO ₃	1A-7	•	•	•	•	•	•			•	•	•		•	•	•	•
8	SrTiO ₃	1A-8	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•
9	CdTiO ₃	1A-9	•	•	•		•				•				•		•	
10	BaTiO ₃ cubic [F]	1A-10a	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	hexagonal [F]	1A-10b	•	•	•	•	•	•		•	•	•	•		•	•	•	
11	PbTiO ₃ [F]	1A-11	•	•	•	•	•	•	•		•	•	•		•	•	•	•
12	CaZrO ₃	1A-12	•		•	•	•				•							•
13	SrZrO ₃	1A-13	•		•	•	•	•			•							•
14	BaZrO ₃	1A-14	•	•	•	•	•				•							
15	PbZrO ₃ [A]	1A-15	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
16	PbHfO ₃ [(A)]	1A-16	•	•	•	•	•				•	•	•	•	•			•
17	CdHfO ₃ [(A)]	1A-17	•	•	•	•	•											
18	BiFeO ₃ [F]	1A-18	•	•	•	•	•				•			•	•		•	
1B Complex perovskite-type oxides																		
1B-a (A ¹⁺ A ³⁺ _{1/2})MO ₃ -type complex perovskite oxides																		
a1	(Na _{1/2} Bi _{1/2})TiO ₃ [F]	1B-a1	•		•	•	•				•	•				•	•	
a2	(K _{1/2} Bi _{1/2})TiO ₃ [F]	1B-a2	•		•	•	•											
1B-b A ²⁺ (M ²⁺ M ⁶⁺ _{1/2})O ₃ -type complex perovskite oxides																		
b1	A(M _{1/2} Te _{1/2})O ₃ (A = Ca, Sr, Cd; M = Mg, Co, Mn, Zn, Ca, Sr, Cd)	1B-b1	•															
b2	Ba(Mg _{1/2} Te _{1/2})O ₃ [F]	1B-b2	•		•		•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
b3	Ba(Ca _{1/2} Te _{1/2})O ₃	1B-b3	•		•		•											
b4	Ba(Mn _{1/2} Te _{1/2})O ₃	1B-b4	•		•		•											
b5	Ba(Co _{1/2} Te _{1/2})O ₃	1B-b5	•		•		•											
b6	Ba(Cd _{1/2} Te _{1/2})O ₃	1B-b6	•		•		•											
b7	Pb(Mg _{1/2} Te _{1/2})O ₃	1B-b7	•		•		•											
b8	Pb(Ca _{1/2} Te _{1/2})O ₃	1B-b8	•		•		•											
b9	Pb(Mn _{1/2} Te _{1/2})O ₃	1B-b9	•		•		•											
b10	Pb(Co _{1/2} Te _{1/2})O ₃	1B-b10	•		•		•											
b11	Pb(Ni _{1/2} Te _{1/2})O ₃	1B-b11	•		•		•											
b12	Pb(Zn _{1/2} Te _{1/2})O ₃	1B-b12	•		•		•											
b13	Pb(Cd _{1/2} Te _{1/2})O ₃	1B-b13	•		•	•	•											
b14	Pb(Mg _{1/2} W _{1/2})O ₃ [A]	1B-b14	•	•	•	•	•	•		•	•						•	
b15	Pb(Cd _{1/2} W _{1/2})O ₃ [(A)]	1B-b15	•	•	•	•	•											
b16	Pb(Mn _{1/2} W _{1/2})O ₃ [(A)]	1B-b16	•		•		•						•	•				
b17	Pb(Co _{1/2} W _{1/2})O ₃ [F, A]	1B-b17	•	•	•	•	•				•			•		•		
b18	Pb(Mn _{1/2} Re _{1/2})O ₃ [(A)]	1B-b18	•		•	•							•	•				
1B-c A²⁺ (M³⁺M⁵⁺_{1/2})O₃-type complex perovskite oxides																		
c1	Cd(Sc _{1/2} Nb _{1/2})O ₃	1B-c1	•		•		•											
c2	Cd(Cr _{1/2} Nb _{1/2})O ₃	1B-c2	•	•	•		•											
c3	Cd(Fe _{1/2} Nb _{1/2})O ₃	1B-c3	•	•		•	•							•	•			
c4	Cd(Co _{1/2} Nb _{1/2})O ₃	1B-c4	•		•		•											
c5	Cd(Sc _{1/2} Ta _{1/2})O ₃	1B-c5	•		•													
c6	Cd(Fe _{1/2} Ta _{1/2})O ₃	1B-c6	•		•													
c7	Ba(In _{1/2} Nb _{1/2})O ₃ [F]	1B-c7	•				•										•	
c8	Ba(In _{1/2} Ta _{1/2})O ₃ [F]	1B-c8	•														•	
c9	Pb(Sc _{1/2} Nb _{1/2})O ₃ [F]	1B-c9	•		•	•	•		•		•		•					
c10	Pb(Mn _{1/2} Nb _{1/2})O ₃ [(F)]	1B-c10	•	•	•		•							•				
c11	Pb(Fe _{1/2} Nb _{1/2})O ₃ [F]	1B-c11	•	•	•	•	•		•	•	•		•	•	•		•	
c12	Pb(Co _{1/2} Nb _{1/2})O ₃	1B-c12	•			•												
c13	Pb(Ni _{1/2} Nb _{1/2})O ₃	1B-c13	•															
c14	Pb(In _{1/2} Nb _{1/2})O ₃ [(F)]	1B-c14	•	•	•	•	•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
c15	Pb(Yb _{1/2} Nb _{1/2})O ₃ [A]	1B-c15	•	•	•	•	•											
c16	Pb(Ho _{1/2} Nb _{1/2})O ₃ [(A)]	1B-c16	•		•		•											
c17	Pb(Lu _{1/2} Nb _{1/2})O ₃ [(A)]	1B-c17	•		•	•	•											
c18	Pb(M _{1/2} Sb _{1/2})O ₃ (M = Sc, Lu, Yb, Tm, Er, Ho)	1B-c18	•		•		•											
c19	Pb(Sc _{1/2} Ta _{1/2})O ₃ [F]	1B-c19	•	•	•	•	•		•		•					•	•	•
c20	Pb(Mn _{1/2} Ta _{1/2})O ₃	1B-c20	•		•													
c21	Pb(Fe _{1/2} Ta _{1/2})O ₃ [F]	1B-c21	•	•	•	•	•				•			•	•			
c22	Pb(Co _{1/2} Ta _{1/2})O ₃	1B-c22	•															
c23	Pb(Yb _{1/2} Ta _{1/2})O ₃ [(A)]	1B-c23	•		•	•	•											
c24	Pb(Lu _{1/2} Ta _{1/2})O ₃ [(A)]	1B-c24	•		•	•	•											
c25	Pb(Fe _{1/2} W _{1/2})O ₃	1B-c25	•											•				
c26	Ba(Bi _{1/2} Bi _{1/2})O ₃	1B-c26	•		•		•				•		•	•				
c27	Pb(M _{1/4} M' _{1/4} M'' _{1/2})O ₃ (M''=Nb, Ta, W; M' = Cd, Cr, Mn, Fe, Co, Ga, In, La, Yb; M = Li, Na, Mg, Sc, Co, Ni, Zn, Cd)	1B-c27	•				•											
c28	Pb(Sc _{1/4} Cr _{1/4} Nb _{1/2})O ₃ [F]	1B-c28	•		•		•											
1B-d A²⁺(M²⁺_{1/3}M'⁵⁺_{2/3})O₃-type complex perovskite oxides																		
d1	Cd(Mg _{1/3} Nb _{2/3})O ₃	1B-d1	•	•	•		•											
d2	Cd(Co _{1/3} Nb _{2/3})O ₃	1B-d2	•	•	•													
d3	Cd(Ni _{1/3} Nb _{2/3})O ₃	1B-d3	•	•	•		•											
d4	Pb(Mg _{1/3} Nb _{2/3})O ₃ [F]	1B-d4	•	•	•	•	•	•	•	•	•	•	•			•		•
d5	Pb(Zn _{1/3} Nb _{2/3})O ₃ [F]	1B-d5	•	•	•	•	•		•	•	•						•	
d6	Pb(Cd _{1/3} Nb _{2/3})O ₃ [F]	1B-d6	•	•	•		•						•					
d7	Pb(Co _{1/3} Nb _{2/3})O ₃ [F]	1B-d7	•	•	•		•											
d8	Pb(Ni _{1/3} Nb _{2/3})O ₃ [F]	1B-d8	•	•	•	•	•				•							
d9	Pb(Mg _{1/3} Ta _{2/3})O ₃ [F]	1B-d9	•	•	•		•				•							
d10	Pb(Co _{1/3} Ta _{2/3})O ₃ [F]	1B-d10	•	•	•		•											
d11	Pb(Ni _{1/3} Ta _{2/3})O ₃ [F]	1B-d11	•	•	•		•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
1B-e A ²⁺ (M ³⁺ _{2/3} M ⁶⁺ _{1/3})O ₃ -type complex perovskite oxides																		
e1	Pb(Fe _{2/3} M _{1/3})O ₃ (M = Te, Mo)	1B-e1	•				•											
e2	Pb(Mn _{2/3} M _{1/3})O ₃ (M = Te, Mo)	1B-e2					•											
e3	Pb(Sc _{2/3} Te _{1/3})O ₃	1B-e3					•											
e4	Pb(Sc _{2/3} W _{1/3})O ₃	1B-e4					•											
e5	Pb(Mn _{2/3} W _{1/3})O ₃ [(A)]	1B-e5	•		•		•						•	•				
e6	Pb(Fe _{2/3} W _{1/3})O ₃ [F]	1B-e6	•	•	•		•							•	•			
e7	Pb(Fe _{2/3} U _{1/3})O ₃	1B-e7	•	•	•		•							•	•			
1B-f A(M,M',M'')O ₃ -type complex perovskite oxides																		
f1	Pb(Cd _{4/9} Nb _{2/9} W _{1/3})O ₃	1B-f1	•		•		•											
f2	Pb(Sc _{5/9} Nb _{1/3} W _{1/9})O ₃	1B-f2	•		•		•											
1B-g (A,A')(M,M')O ₃ -type complex perovskite oxides																		
g1	(K _{3/4} Bi _{1/4})(Mg _{1/6} Nb _{5/6})O ₃	1B-g1	•		•		•											
g2	(K _{3/4} Bi _{1/4})(Zn _{1/6} Nb _{5/6})O ₃	1B-g2	•	•	•	•	•			•	•		•					
g3	(K _{3/4} Bi _{1/4})(Mg _{1/6} Ta _{5/6})O ₃	1B-g3	•		•		•											
g4	(K _{1/3} Pb _{2/3})(Zn _{2/9} Nb _{7/9})O ₃	1B-g4	•		•	•	•				•							
1C Solid solutions with perovskite-type oxides as end members																		
1C-a Solid solutions with simple perovskite-type oxides as end members																		
a1	NaNbO ₃ –KNbO ₃	1C-a1	•		•	•	•	•	•									•
a2	NaNbO ₃ –NaTaO ₃	1C-a2	•		•	•	•				•							
a3	NaNbO ₃ –KTaO ₃	1C-a3	•		•	•	•											
a4	NaNbO ₃ –NaSbO ₃	1C-a4	•															
a5	NaNbO ₃ –KSbO ₃	1C-a5	•															
a6	NaNbO ₃ –CaTiO ₃	1C-a6	•				•											
a7	NaNbO ₃ –BaTiO ₃	1C-a7	•				•											
a8	NaNbO ₃ –PbTiO ₃	1C-a8	•				•											
a9	NaNbO ₃ –PbZrO ₃	1C-a9	•				•											
a10	NaNbO ₃ –LiNbO ₃	1C-a10	•		•	•	•		•	•	•							
a11	NaNbO ₃ –NaVO ₃	1C-a11					•										•	

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
a12	NaNbO ₃ –CaNb ₂ O ₆	1C-a12	•				•											
a13	NaNbO ₃ –SrNb ₂ O ₆	1C-a13	•		•		•		•									
a14	NaNbO ₃ –CdNb ₂ O ₆	1C-a14	•		•		•		•	•								
a15	NaNbO ₃ –PbNb ₂ O ₆	1C-a15	•		•		•		•									
a16	KNbO ₃ –KTaO ₃ (including KTN)	1C-a16	•		•		•	•	•	•	•	•			•	•	•	•
a17	KNbO ₃ –BaTiO ₃	1C-a17	•				•											
a18	KNbO ₃ –PbTiO ₃	1C-a18	•		•		•											
a19	KNbO ₃ –AgNbO ₃	1C-a19			•		•											
a20	NaTaO ₃ –KTaO ₃	1C-a20	•		•		•				•				•			
a21	NaTaO ₃ –CdTiO ₃	1C-a21			•													
a22	KTaO ₃ –PbTiO ₃	1C-a22	•		•		•											
a23	KTaO ₃ –LiTaO ₃	1C-a23					•	•		•	•				•	•		
a24	CaTiO ₃ –SrTiO ₃	1C-a24	•		•		•											
a25	CaTiO ₃ –BaTiO ₃	1C-a25	•	•	•		•	•	•									
a26	CaTiO ₃ –PbTiO ₃	1C-a26	•		•		•			•							•	•
a27	CaTiO ₃ –CaZrO ₃	1C-a27			•		•											
a28	SrTiO ₃ –BaTiO ₃	1C-a28	•	•	•		•	•		•			•			•	•	
a29	SrTiO ₃ –PbTiO ₃	1C-a29	•		•		•	•			•							
a30	SrTiO ₃ –SrZrO ₃	1C-a30															•	
a31	SrTiO ₃ –LaCoO ₃	1C-a31					•											
a32	SrTiO ₃ –LaNiO ₃	1C-a32					•											
a33	SrTiO ₃ –BiFeO ₃	1C-a33	•		•													
a34	SrTiO ₃ –SrNb ₂ O ₆	1C-a34			•		•											
a35	SrTiO ₃ –LaO _{1.5} · α TiO ₂	1C-a35					•											
a36	SrTiO ₃ –Bi _{2/3} O · TiO ₂	1C-a36	•		•		•											
a37	CdTiO ₃ –BaTiO ₃	1C-a37	•		•		•											
a38	CdTiO ₃ –BiFeO ₃	1C-a38			•													
a39	CdTiO ₃ –LiNbO ₃	1C-a39					•											
a40	CdTiO ₃ –LiTaO ₃	1C-a40					•											
a41	BaTiO ₃ –PbTiO ₃	1C-a41	•		•		•	•	•			•	•					•
a42	BaTiO ₃ –BaZrO ₃	1C-a42	•		•		•			•							•	

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
a43	BaTiO ₃ –PbZrO ₃	1C-a43				•	•											
a44	BaTiO ₃ –BaSnO ₃	1C-a44	•			•	•		•						•			•
a45	BaTiO ₃ –PbO·SnO ₂	1C-a45	•				•											
a46	BaTiO ₃ –BaHfO ₃	1C-a46	•		•		•											
a47	BaTiO ₃ –BaUO ₃	1C-a47			•													
a48	BaTiO ₃ –LaAlO ₃	1C-a48	•		•													
a49	BaTiO ₃ –LaCoO ₃	1C-a49					•											
a50	BaTiO ₃ –LaNiO ₃	1C-a50					•											
a51	BaTiO ₃ –BiFeO ₃	1C-a51												•	•			
a52	BaTiO ₃ –NiTiO ₃	1C-a52									•							
a53	BaTiO ₃ –BaNb ₂ O ₆	1C-a53	•															
a54	BaTiO ₃ –PbNb ₂ O ₆	1C-a54			•													
a55	BaTiO ₃ –BaTa ₂ O ₆	1C-a55			•		•											
a56	BaTiO ₃ –A ₂ M ₂ O ₇ (A = Mn, Co, Ni; M = Nb, Ta)	1C-a56	•				•											
a57	BaTiO ₃ –Ba ₅ Nb ₄ O ₁₅	1C-a57			•		•											
a58	BaTiO ₃ –Nd _{2/3} O·TiO ₂	1C-a58					•											
a59	PbTiO ₃ –CaZrO ₃	1C-a59	•		•		•											
a60	PbTiO ₃ –SrZrO ₃	1C-a60	•		•		•											
a61	PbTiO ₃ –BaZrO ₃	1C-a61	•		•	•	•		•									
a62	PbTiO ₃ –PbZrO ₃	1C-a62	•	•	•	•	•	•	•	•	•	•	•		•		•	•
a63	Pb(Ti _{1-x} Zr _x)O ₃ (x = 0.5...0.6, lead zirconate-titanate) (PZT)	1C-a63	•		•	•	•		•	•			•				•	•
a64	PbTiO ₃ –CaSnO ₃	1C-a64	•		•		•											
a65	PbTiO ₃ –SrSnO ₃	1C-a65	•		•		•											
a66	PbTiO ₃ –BaSnO ₃	1C-a66	•		•													
a67	PbTiO ₃ –PbO·SnO ₂	1C-a67	•				•		•									
a68	PbTiO ₃ –PbHfO ₃	1C-a68	•				•		•									
a69	PbTiO ₃ –LaAlO ₃	1C-a69	•		•		•											
a70	PbTiO ₃ –LaMnO ₃	1C-a70	•		•		•											
a71	PbTiO ₃ –LaFeO ₃	1C-a71	•		•		•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
a72	PbTiO ₃ –LaCoO ₃	1C-a72					•											
a73	PbTiO ₃ –BiFeO ₃	1C-a73	•		•		•								•			
a74	PbTiO ₃ –BiMnO ₃	1C-a74	•		•	•												
a75	PbTiO ₃ –BaNb ₂ O ₆	1C-a75					•											
a76	PbTiO ₃ –Ba ₅ Nb ₄ O ₁₅	1C-a76	•				•		•									
a77	PbTiO ₃ –LaO _{1.5} · α TiO ₂	1C-a77	•		•		•		•		•	•						•
a78	PbTiO ₃ –Bi ₂ O ₃ ·NiO·TiO ₂	1C-a78	•				•											
a79	CaZrO ₃ –BaZrO ₃	1C-a79			•													
a80	CaZrO ₃ –PbZrO ₃	1C-a80	•			•	•											
a81	SrZrO ₃ –PbZrO ₃	1C-a81	•		•	•	•	•										
a82	BaZrO ₃ –PbZrO ₃	1C-a82	•		•	•	•	•		•								
a83	PbZrO ₃ –PbO·SnO ₂	1C-a83	•		•	•	•											
a84	PbZrO ₃ –PbHfO ₃	1C-a84	•				•											
a85	PbZrO ₃ –BiFeO ₃	1C-a85	•		•		•								•			
a86	PbZrO ₃ –PbNb ₂ O ₆	1C-a86	•			•	•											
a87	PbZrO ₃ –PbTa ₂ O ₆	1C-a87	•			•	•											
a88	CaSnO ₃ –SrSnO ₃	1C-a88			•													
a89	SrSnO ₃ –BaSnO ₃	1C-a89			•													
a90	SrSnO ₃ –PbO·SnO ₂	1C-a90					•											
a91	SrSnO ₃ –BiFeO ₃	1C-a91	•												•			
a92	BaSnO ₃ –PbO·SnO ₂	1C-a92	•				•											
a93	CaHfO ₃ –PbHfO ₃	1C-a93	•			•	•											
a94	SrHfO ₃ –PbHfO ₃	1C-a94	•				•											
a95	BaHfO ₃ –PbHfO ₃	1C-a95	•															
a96	BiFeO ₃ –SrFeO ₃	1C-a96			•									•				
a97	BiFeO ₃ –LaAlO ₃	1C-a97	•		•		•											
a98	BiFeO ₃ –LaCrO ₃	1C-a98	•		•	•								•				
a99	BiFeO ₃ –LaFeO ₃	1C-a99	•		•		•							•				
a100	AgNbO ₃ –AgTaO ₃	1C-a100	•				•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
1C-b Solid solutions with complex perovskite-type oxides as end members																		
b1	CaTiO ₃ –(Na _{1/2} Bi _{1/2})TiO ₃	1C-b1	•															
b2	SrTiO ₃ –(Na _{1/2} Bi _{1/2})TiO ₃	1C-b2					•											
b3	SrTiO ₃ –(K _{1/2} Bi _{1/2})TiO ₃	1C-b3	•															
b4	SrTiO ₃ –Sr(Fe _{1/2} Ta _{1/2})O ₃	1C-b4	•															
b5	SrTiO ₃ –Pb(Sc _{1/2} Nb _{1/2})O ₃	1C-b5					•											
b6	SrTiO ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-b6	•				•											
b7	CdTiO ₃ –(Na _{1/2} Bi _{1/2})TiO ₃	1C-b7					•											
b8	BaTiO ₃ –(Na _{1/2} Bi _{1/2})TiO ₃	1C-b8	•				•		•									
b9	BaTiO ₃ –(K _{1/2} Bi _{1/2})TiO ₃	1C-b9	•		•													
b10	BaTiO ₃ –(Li _{1/2} La _{1/2})TiO ₃	1C-b10					•											
b11	BaTiO ₃ –(Na _{1/2} La _{1/2})TiO ₃	1C-b11					•											
b12	BaTiO ₃ –(K _{1/2} La _{1/2})TiO ₃	1C-b12					•											
b13	BaTiO ₃ –Ba(Fe _{1/2} Ta _{1/2})O ₃	1C-b13	•															
b14	BaTiO ₃ –Ba(M' _{1/2} M'' _{1/2})O ₃ (M' = Mg, Co; M'' = Nb, Ta)	1C-b14	•															
b15	BaTiO ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b15	•				•											
b16	BaTiO ₃ –Pb(Co _{1/2} W _{1/2})O ₃	1C-b16	•				•							•				
b17	BaTiO ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-b17					•											
b18	BaTiO ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-b18	•				•											
b19	BaTiO ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b19					•								•			
b20	BaSnO ₃ –Ba(Zn _{1/3} Nb _{2/3})O ₃	1C-b20					•											
b21	PbTiO ₃ –(Li _{1/2} La _{1/2})TiO ₃	1C-b21	•		•													
b22	PbTiO ₃ –(Li _{1/2} Ce _{1/2})TiO ₃	1C-b22			•													
b23	PbTiO ₃ –(Li _{1/2} Nd _{1/2})TiO ₃	1C-b23			•													
b24	PbTiO ₃ –(Na _{1/2} La _{1/2})TiO ₃	1C-b24	•		•													
b25	PbTiO ₃ –(Na _{1/2} Bi _{1/2})TiO ₃	1C-b25	•		•		•		•									
b26	PbTiO ₃ –(K _{1/2} Bi _{1/2})TiO ₃	1C-b26	•		•													
b27	PbTiO ₃ –(Ba _{1/2} Bi _{1/2})(Mg _{1/2} Nb _{1/2})O ₃	1C-b27					•											
b28	PbTiO ₃ –Sr(Sc _{1/2} Nb _{1/2})O ₃	1C-b28	•															
b29	PbTiO ₃ –Ba(Sc _{1/2} Nb _{1/2})O ₃	1C-b29	•															

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
b30	PbTiO ₃ –Ti(Zr _{1/2} W _{1/2})O ₃	1C-b30	•	•														
b31	PbTiO ₃ –Pb(Al _{1/2} Nb _{1/2})O ₃	1C-b31					•											
b32	PbTiO ₃ –Pb(Mg _{1/2} W _{1/2})O ₃	1C-b32	•	•			•											
b33	PbTiO ₃ –Pb(Co _{1/2} W _{1/2})O ₃	1C-b33	•				•											
b34	PbTiO ₃ –Pb(Sc _{1/2} Nb _{1/2})O ₃	1C-b34	•	•	•		•		•									
b35	PbTiO ₃ –Pb(Sc _{1/2} Ta _{1/2})O ₃	1C-b35	•				•											
b36	PbTiO ₃ –Pb(Mn _{1/2} Nb _{1/2})O ₃	1C-b36	•	•														
b37	PbTiO ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b37		•			•						•					•
b38	PbTiO ₃ –Pb(Fe _{1/2} Ta _{1/2})O ₃	1C-b38	•				•											
b39	PbTiO ₃ –Pb(In _{1/2} Nb _{1/2})O ₃	1C-b39	•	•			•		•									
b40	PbTiO ₃ –Pb(Yb _{1/2} Nb _{1/2})O ₃	1C-b40	•				•		•									
b41	PbTiO ₃ –Sr(Cu _{1/3} Nb _{2/3})O ₃	1C-b41	•	•			•											
b42	PbTiO ₃ –Ba(Zn _{1/3} Nb _{2/3})O ₃	1C-b42	•	•			•		•									
b43	PbTiO ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-b43	•	•			•		•									•
b44	PbTiO ₃ –Pb(Mg _{1/3} Ta _{2/3})O ₃	1C-b44	•				•											
b45	PbTiO ₃ –Pb(Ni _{1/3} Nb _{2/3})O ₃	1C-b45		•			•											
b46	PbTiO ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-b46	•	•	•		•		•	•	•							•
b47	PbTiO ₃ –Pb(Mn _{2/3} W _{1/3})O ₃	1C-b47		•														
b48	PbTiO ₃ –La(Mg _{2/3} Nb _{1/3})O ₃	1C-b48		•			•		•									
b49	PbTiO ₃ –La(Zn _{2/3} Nb _{1/3})O ₃	1C-b49	•	•			•		•									
b50	PbTiO ₃ –Bi(Mg _{2/3} Nb _{1/3})O ₃	1C-b50		•			•											
b51	PbTiO ₃ –Bi(Zn _{2/3} Nb _{1/3})O ₃	1C-b51		•														
b52	PbZrO ₃ –(Na _{1/2} Bi _{1/2})TiO ₃	1C-b52	•															
b53	PbZrO ₃ –(Na _{1/2} Bi _{1/2})ZrO ₃	1C-b53	•	•			•											
b54	PbZrO ₃ –(K _{1/2} Bi _{1/2})ZrO ₃	1C-b54	•	•			•											
b55	PbZrO ₃ –Ti(Zr _{1/2} W _{1/2})O ₃	1C-b55	•															
b56	PbZrO ₃ –Pb(Mg _{1/2} W _{1/2})O ₃	1C-b56	•				•											
b57	PbZrO ₃ –Pb(Co _{1/2} W _{1/2})O ₃	1C-b57	•				•											
b58	PbZrO ₃ –Pb(Sc _{1/2} Nb _{1/2})O ₃	1C-b58	•	•			•											
b59	PbZrO ₃ –Pb(Sc _{1/2} Ta _{1/2})O ₃	1C-b59					•											
b60	PbZrO ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b60	•				•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
b61	PbZrO ₃ –Pb(Fe _{1/2} Ta _{1/2})O ₃	1C-b61	•															
b62	PbZrO ₃ –Pb(In _{1/2} Nb _{1/2})O ₃	1C-b62	•															
b63	PbZrO ₃ –Pb(Yb _{1/2} Nb _{1/2})O ₃	1C-b63					•											
b64	PbZrO ₃ –Sr(Cu _{1/3} Nb _{2/3})O ₃	1C-b64		•			•											
b65	PbZrO ₃ –Ba(Ca _{1/3} Nb _{2/3})O ₃	1C-b65	•				•											
b66	PbZrO ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-b66					•											
b67	PbZrO ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-b67	•	•			•		•									
b68	PbZrO ₃ –Pb(Fe _{2/3} U _{1/3})O ₃	1C-b68	•	•	•		•											
b69	PbHfO ₃ –Pb(Sc _{1/2} Nb _{1/2})O ₃	1C-b69	•															
b70	BiFeO ₃ –Pb(Mg _{1/2} W _{1/2})O ₃	1C-b70	•	•			•											
b71	BiFeO ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b71		•			•	•						•				
b72	BiFeO ₃ –Sr(Sn _{1/3} Mn _{2/3})O ₃	1C-b72	•	•											•			
b73	(Na _{1/2} Bi _{1/2})TiO ₃ –(K _{1/2} Bi _{1/2})TiO ₃	1C-b73	•	•			•											
b74	Sr(Fe _{2/3} Te _{1/3})O ₃ –Pb(Fe _{2/3} Te _{1/3})O ₃	1C-b74					•											
b75	Ba(Sc _{1/2} Nb _{1/2})O ₃ –Pb(Sc _{1/2} Nb _{1/2})O ₃	1C-b75					•				•							
b76	Ba(Fe _{1/2} Nb _{1/2})O ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b76					•											
b77	Ba(In _{1/2} Nb _{1/2})O ₃ –Pb(In _{1/2} Nb _{1/2})O ₃	1C-b77					•											
b78	Ba(In _{1/2} Ta _{1/2})O ₃ –Pb(In _{1/2} Ta _{1/2})O ₃	1C-b78					•											
b79	Ba(Yb _{1/2} Nb _{1/2})O ₃ –Pb(Yb _{1/2} Nb _{1/2})O ₃	1C-b79	•				•											
b80	Ba(Mg _{1/3} Nb _{2/3})O ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-b80					•											
b81	Ba(Zn _{1/3} Nb _{2/3})O ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-b81		•														
b82	Ba(Cd _{1/3} Nb _{2/3})O ₃ –Pb(Cd _{1/3} Nb _{2/3})O ₃	1C-b82					•											
b83	Pb(Al _{1/2} Nb _{1/2})O ₃ –Pb(Sc _{1/2} Nb _{1/2})O ₃	1C-b83					•											
b84	Pb(Mg _{1/2} Te _{1/2})O ₃ –Pb(Mg _{1/2} W _{1/2})O ₃	1C-b84	•	•			•											
b85	Pb(Mg _{1/2} W _{1/2})O ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b85	•				•											
b86	Pb(Mg _{1/2} W _{1/2})O ₃ –Pb(Fe _{1/2} Ta _{1/2})O ₃	1C-b86	•	•			•											
b87	Pb(Mg _{1/2} W _{1/2})O ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-b87	•				•		•									
b88	Pb(Mg _{1/2} W _{1/2})O ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b88					•							•				
b89	Pb(Sc _{1/2} Nb _{1/2})O ₃ –Pb(Sc _{1/2} Sb _{1/2})O ₃	1C-b89					•											
b90	Pb(Sc _{1/2} Nb _{1/2})O ₃ –Pb(Sc _{1/2} Ta _{1/2})O ₃	1C-b90		•			•											
b91	Pb(Sc _{1/2} Nb _{1/2})O ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-b91	•	•														

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
b92	Pb(Sc _{1/2} Nb _{1/2})O ₃ –Pb(Yb _{1/2} Nb _{1/2})O ₃	1C-b92	•				•											
b93	Pb(Sc _{1/2} Nb _{1/2})O ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-b93	•				•											
b94	Pb(Sc _{1/2} Ta _{1/2})O ₃ –Pb(Sc _{1/2} Sb _{1/2})O ₃	1C-b94					•											
b95	Pb(Mn _{1/2} W _{1/2})O ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b95	•		•		•							•	•			
b96	Pb(Fe _{1/2} Nb _{1/2})O ₃ –Pb(Fe _{1/2} Ta _{1/2})O ₃	1C-b96	•				•											
b97	Pb(Fe _{1/2} Nb _{1/2})O ₃ –Pb(Yb _{1/2} Nb _{1/2})O ₃	1C-b97					•											
b98	Pb(Fe _{1/2} Nb _{1/2})O ₃ –Pb(Ni _{1/3} Nb _{2/3})O ₃	1C-b98	•				•											
b99	Pb(Fe _{1/2} Nb _{1/2})O ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-b99	•															
b100	Pb(Fe _{1/2} Nb _{1/2})O ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b100					•											
b101	Pb(Co _{1/2} W _{1/2})O ₃ –Pb(Yb _{1/2} Nb _{1/2})O ₃	1C-b101			•		•											
b102	Pb(Co _{1/2} W _{1/2})O ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b102	•		•		•							•	•			
b103	Pb(In _{1/2} Ta _{1/2})O ₃ –Pb(Yb _{1/2} Ta _{1/2})O ₃	1C-b103					•											
b104	Pb(Yb _{1/2} Nb _{1/2})O ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b104			•		•							•				
b105	Pb(Mg _{1/3} Nb _{2/3})O ₃ –Pb(Cd _{1/3} Nb _{2/3})O ₃	1C-b105					•											
b106	Pb(Mg _{1/3} Ta _{2/3})O ₃ –Pb(Fe _{2/3} W _{1/3})O ₃	1C-b106	•		•		•											
b107	Pb(Fe _{2/3} W _{1/3})O ₃ –Pb(Fe _{2/3} U _{1/3})O ₃	1C-b107			•		•											
b108	Pb(Fe _{2/3} W _{1/3})O ₃ –Pb(Ga _{2/3} W _{1/3})O ₃	1C-b108	•		•		•											
b109	Pb(Mg _{1/2} W _{1/2})O ₃ –La _{2/3} (Mg _{1/2} W _{1/2})O ₃	1C-b109	•				•											
1C-c Ternary solid solutions, etc. with perovskite type oxides as constituents																		
c1	(Na,K)(Nb,Ta)O ₃	1C-c1	•															
c2	(Li,Na)(Ta,Nb)O ₃	1C-c2	•		•		•											
c3	(Li,K)(Ta,Nb)O ₃	1C-c3	•	•			•											
c4	(Li,Ba)(Ti,Zr)O ₃	1C-c4					•											
c5	(Ca,Ba)(Ti,Zr)O ₃	1C-c5	•				•											
c6	(Ba,Sr)(Ti,Zr)O ₃	1C-c6			•		•											
c7	(Ca,Pb)(Ti,Zr)O ₃	1C-c7					•		•									
c8	(Sr,Pb)(Ti,Zr)O ₃	1C-c8	•		•		•		•									
c9	(Ba,Pb)(Ti,Zr)O ₃	1C-c9	•		•		•		•		•							
c10	(Ba,Pb)(Ti,Sn)O ₃	1C-c10	•		•		•											
c11	(Ca,Ba)(Ti,Sn)O ₃	1C-c11			•		•											
c12	(Li,Ca)(Ta,Zr)O ₃	1C-c12					•											

Subvolume III/36A1			Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance	No.																
c13	NaNbO ₃ –SrNb ₂ O ₆ –CdNb ₂ O ₆	1C-c13			•	•	•											
c14	CaTiO ₃ –SrTiO ₃ –BaTiO ₃	1C-c14	•		•													
c15	CaTiO ₃ –SrTiO ₃ –PbTiO ₃	1C-c15					•											
c16	CaTiO ₃ –BaTiO ₃ –PbTiO ₃	1C-c16	•				•		•	•								
c17	SrTiO ₃ –PbTiO ₃ –LaMnO ₃	1C-c17	•															
c18	SrTiO ₃ –BaTiO ₃ –LaYO ₃ –LaInO ₃	1C-c18	•															
c19	BaTiO ₃ –PbTiO ₃ –BaNb ₂ O ₆ –PbNb ₂ O ₆	1C-c19	•		•													
c20	(Pb,Ca,M)Ti(Co _{1/2} W _{1/2})O ₃ (M = Sr, Ba)	1C-c20					•		•									
c21	(Pb,Ca)[(M,Nb)Ti]O ₃ (M = Mg, Fe)	1C-c21					•											
c22	PbTiO ₃ –PbZrO ₃ –AMO ₃ (A = Na, K, La, Bi, Ba, Ca; M = Sb, Nb, Bi, Al, Cr, Fe)	1C-c22	•				•											
c23	PbTiO ₃ –PbZrO ₃ –BiFeO ₃	1C-c23	•		•		•								•			
c24	PbTiO ₃ –PbZrO ₃ –LaFeO ₃	1C-c24	•		•													
c25	PbTiO ₃ –PbZrO ₃ –PbO·SnO ₂	1C-c25	•				•		•									•
c26	PbTiO ₃ –PbZrO ₃ –PbO·SnO ₂ –PbNb ₂ O ₆	1C-c26	•			•	•		•	•					•			•
c27	PbTiO ₃ –PbZrO ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-c27	•		•		•		•									
c28	PbTiO ₃ –PbZrO ₃ –Pb(Sb _{1/2} Nb _{1/2})O ₃	1C-c28	•		•													
c29	PbTiO ₃ –PbZrO ₃ –Ba(La _{1/2} Nb _{1/2})O ₃	1C-c29	•		•		•		•		•							
c30	PbTiO ₃ –PbZrO ₃ –Pb(Fe _{1/2} Ta _{1/2})O ₃	1C-c30	•															
c31	PbTiO ₃ –PbZrO ₃ –Pb(Mg _{1/2} W _{1/2})O ₃	1C-c31	•				•		•	•								
c32	PbTiO ₃ –PbZrO ₃ –Pb(Co _{1/2} W _{1/2})O ₃	1C-c32	•		•				•									
c33	PbTiO ₃ –PbZrO ₃ –Pb(Cd _{1/2} W _{1/2})O ₃	1C-c33	•				•			•								
c34	PbTiO ₃ –PbZrO ₃ –Pb(Mg _{1/3} Nb _{2/3})O ₃	1C-c34	•		•		•		•									
c35	PbTiO ₃ –PbZrO ₃ –Pb(Co _{1/3} Nb _{2/3})O ₃	1C-c35	•				•		•									
c36	PbTiO ₃ –PbZrO ₃ –Pb(Ni _{1/3} Nb _{2/3})O ₃	1C-c36	•				•		•									
c37	PbTiO ₃ –PbZrO ₃ –Pb(Zn _{1/3} Nb _{2/3})O ₃	1C-c37	•		•		•		•									
c38	PbTiO ₃ –PbZrO ₃ –A(Zn _{1/3} Nb _{2/3})O ₃ (A = Ba, Sr, Ca)	1C-c38	•		•		•		•		•							
c39	PbTiO ₃ –PbZrO ₃ –Pb(Ni _{1/3} Nb _{2/3})O ₃ –Pb(Mn _{1/3} Nb _{2/3})O ₃	1C-c39			•		•											

Subvolume III/36A1		No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellanea
No.	Substance																	
c40	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Pb}(\text{Sn}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c40	•				•		•	•								
c41	$\text{PbTiO}_3\text{--PbZrO}_3\text{--A}(\text{A}'_{1/3}\text{Nb}_{2/3})\text{O}_3$ (A = Ba, Sr; A' = Pb, Ca, Sr)	1C-c41	•		•		•		•		•							
c42	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Pb}(\text{Sb}_{1/3}\text{Mn}_{2/3})\text{O}_3\text{--Pb}(\text{W}_{1/2}\text{Mg}_{1/2})\text{O}_3$	1C-c42							•									
c43	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Pb}(\text{Cd}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c43	•															
c44	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Ba}(\text{Ca}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c44					•				•							
c45	$\text{PbTiO}_3\text{--PbZrO}_3$ $\text{--Pb}(\text{Li}_{1/4}\text{Sb}_{1/4}\text{Mo}_{1/2})\text{O}_3$	1C-c45																•
c46	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Sr}(\text{Li}_{2/5}\text{W}_{3/5})\text{O}_3$	1C-c46							•	•								
c47	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Sr}_x\text{Nb}_{4x/5}\text{O}_3$	1C-c47	•		•		•											
c48	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Ba}_x\text{Nb}_{4x/5}\text{O}_3$	1C-c48	•		•		•				•							
c49	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Sr}(\text{La}_{1/2}\text{Nb}_{1/2})\text{O}_3$	1C-c49					•		•		•							
c50	$\text{PbTiO}_3\text{--PbZrO}_3\text{--In}(\text{Li}_{3/5}\text{W}_{2/5})\text{O}_3$	1C-c50					•											
c51	$\text{PbTiO}_3\text{--PbZrO}_3\text{--PbNb}_2\text{O}_6$	1C-c51	•				•		•									
c52	$\text{PbTiO}_3\text{--Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Ba}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c52	•															
c53	$\text{PbTiO}_3\text{--LaMnO}_3\text{--LaMO}_3$ (M = Fe, Co, Ni, Cr)	1C-c53	•				•							•				
c54	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c54					•											
c55	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Pb}(\text{Ni}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c55	•						•									
c56	$\text{PbTiO}_3\text{--PbZrO}_3\text{--Pb}(\text{Mn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Pb}(\text{M}^{\text{I}}_{1-\alpha}\text{M}^{\text{II}}_{\alpha})\text{O}_3$	1C-c56					•		•									
c57	$(\text{Pb},\text{Ba})[(\text{Mg},\text{Nb})_x(\text{Zn},\text{Nb})_y\text{Ti}]_z\text{O}_3$	1C-c57	•				•											
c58	$\text{PbTiO}_3\text{--Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Ba}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c58					•											
c59	$\text{PbTiO}_3\text{--Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ $\text{--Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c59					•											
c60	$\text{Ba}(\text{Ti},\text{Zr})\text{O}_3\text{--Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$	1C-c60					•											

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No.	Substance	No.	Fundamentals	Material preparation	Crystal structure	Lattice distortion	Dielectric properties	Thermal properties	Electromechanical	Elastic properties	Optical properties	Light scattering	Conduction	Magnetism	NMR, ESR	Local structures	Domains	Miscellaneous
c61	PbTiO ₃ –Pb(Fe _{2/3} W _{1/3})O ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃	1C-c61	•				•											
c62	Pb(W _{1/3} Fe _{2/3})O ₃ –Pb(Fe _{1/2} Nb _{1/2})O ₃ –Pb ₅ Ge ₃ O ₁₁	1C-c62					•											
c63	PbTiO ₃ –PbHfO ₃ –PbO·SnO ₂	1C-c63	•															
c64	PbTiO ₃ –PbHfO ₃ modified with La (PLHT)	1C-c64	•				•		•		•							
c65	BaZrO ₃ –PbZrO ₃ –BaNb ₂ O ₆ –PbNb ₂ O ₆	1C-c65	•															
c66	PLZT	1C-c66	•	•	•	•	•	•	•	•	•	•	•	•			•	•
c67	[Pb _{1–x} (La _{0.5} Li _{0.5}) _x](Zr _y Ti _{1–y})O ₃ (PLLZT)	1C-c67	•	•	•		•				•							
c68	Solid solutions related to PLZT	1C-c68					•				•							
2 LiNbO ₃ family																		
2A Pure compounds																		
1	LiNbO ₃ [F]	2A-1	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
2	LiTaO ₃ [F]	2A-2	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
2B Solid solutions																		
1	LiNbO ₃ –HNbO ₃	2B-1	•	•	•	•				•	•	•	•		•		•	•
2	Li ₂ O–Nb ₂ O ₅ –MO (M = Mg, Cu, Zn)	2B-2	•	•	•		•		•	•	•	•	•		•	•	•	•
3	Li ₂ O–Nb ₂ O ₅ –M ₂ O ₃ (M = Cr, Co, Sc, Fe, Eu, Er, Tm)	2B-3	•	•	•						•		•		•	•		•
4	Li ₂ O–Nb ₂ O ₅ –MO ₂ (M = Ti, Zr, Sn, Te)	2B-4	•		•						•	•				•		•
5	LiNbO ₃ –NaNbO ₃	2B-5	•		•	•	•			•								•
6	LiNbO ₃ –LiTaO ₃	2B-6	•	•	•	•	•		•	•	•				•			•
7	LiNbO ₃ –NaNbO ₃ –LiTaO ₃ –NaTaO ₃	2B-7			•													
8	LiNbO ₃ –AMO ₃ (A = Ca, Cd; M = Ti, Zr)	2B-8	•															
9	LiTaO ₃ –HTaO ₃	2B-9		•	•						•	•					•	•

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10	LiTaO ₃ –LiSbO ₃	2B-10	•		•		•											
11	Li ₂ O–Ta ₂ O ₅ –M ₂ O (M = Na, Ag)	2B-11	•		•													•
12	Li ₂ O–Ta ₂ O ₅ –MO (M = Mg, Ca, Ni, Cu, Zn)	2B-12	•		•		•											•
13	Li ₂ O–Ta ₂ O ₅ –M ₂ O ₃ (M = Al, Cr, Fe, In)	2B-13	•		•		•										•	
14	LiTaO ₃ –LiF·MF ₂ (M = Mg, Zn)	2B-14	•	•			•											
15	Li ₂ O–Ta ₂ O ₅ –MO ₂ (M = Ti, Zr, Sn)	2B-15	•		•		•											
16	Li ₂ O–Ta ₂ O ₅ –MO ₃ (M = Mo, W)	2B-16	•		•		•						•					
17	LiTaO ₃ –AMO ₃ (A = Mg, Ca, Co, Sr, Zn; M = Ti, Zr)	2B-17	•		•		•											

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