No. 1C-c37 $PbTiO_3$–$PbZrO_3$–$Pb(Zn_{1/3}Nb_{2/3})O_3$

1b	Phase diagram: Fig. 1C-c37-001, Fig. 1C-c37-002.	
3a	Lattice parameter: Fig. 1C-c37-003.	
5a	Dielectric constant: Tables 1C-c37-001...1C-c37-003; Fig. 1C-c37-004	
c	Spontaneous polarization; Tables 1C-c37-001...1C-c37-003.	
d	Pyroelectric effect: Tables 1C-c37-001...1C-c37-003.	
7a	Piezoelectricity: Fig. 1C-c37-005; see also	84Ugr

Table 1C-c37-001. x $PbTiO_3$·y $PbZrO_3$·z $Pb(Zn_{1/3}Nb_{2/3})O_3$ (ceramics). Dielectric properties [89Lia1]. *p*: pyroelectric coefficient. Θ: phase transition temperature.

Composition [%]			Θ_f	κ	tan δ	P_s	*p*	Θ [°C]	Θ [°C]
x	y	z	[°C]		[%]	[$\cdot 10^{-2}$ Cm^{-2}]	[$\cdot 10^{-5}$ $Cm^{-2}K^{-1}$]	(heating)	(cooling)
0	95	5	217	307	1.4			125 [a])	70 [b])
1	94	5	226	229	1.3			102 [a])	25 [b])
2	93	5 [c])	228	295	1.5			69 [a])	
2	93	5	225	285	2.3	32	45	14 [d])	8 [e])
3	92	5	228	372	2.6	38	289	28 [d])	23 [e])
4	91	5	234	307	2.8	34	36	44 [d])	38 [e])
2	92	6	227	370	2.4		88	16 [d])	11 [e])
2	91	7	228	347	2.7	27	99	18 [d])	11 [e])
2	90	8	234	417	3.1	5.3	9	44 [d])	38 [e])
4.5	95.5	0		548	2.3		112	31 [d])	21 [e])
5	95	0	246	502	3.0	44	46	40 [d])	34 [e])

[a]) $A_\alpha \rightarrow F_{\alpha HT}$; [b]) $F_{\alpha HT} \rightarrow A_\alpha$; [c]) unpoled sample; [d]) $F_{\alpha LT} \rightarrow F_{\alpha HT}$; [e]) $F_{\alpha HT} \rightarrow F_{\alpha LT}$.

Table 1C–c37–002. x $PbTiO_3$·y $PbZrO_3$·z $Pb(Zn_{1/3}Nb_{2/3})O_3$ (x+y+z = 1, ceramics). Dielectric properties [89Lia2]. *p*: pyroelectric coefficient. F.M.: figure of merit. Θ: phase transition temperature between lower temperature rhombohedral ferroelectric and higher temperature rhombohedral phases.

Sample 100z/100x	Θ_f [°C]	κ	tan δ [%]	P_s [$\cdot 10^{-2}$ Cm^{-2}]	*p* [$\cdot 10^{-5}$ $Cm^{-2}K^{-1}$]	F.M.	Θ [°C] (heating)	Θ [°C] (cooling)
5/7	242	364	3.4	38.6	27.6	3.04	78	72
7/7	244	407	3.8	38.0	28.3	2.73	75	71
9/7	244	400	3.8	38.8	30.0	2.98	72	68
11/7	242	419	3.9	40.2	33.2	3.11	68	67
13/7	242	413	3.2	44.7	36.8	3.49	60	60
20/7	238	479	3.5	40.4	41.4			
35/7	222	583	3.9					

Table 1C-c37-003. 0.07 $PbTiO_3$·0.88 $PbZrO_3$·0.05 $Pb(Zn_{1/3}Nb_{2/3})O_3$ (ceramics). Dielectric properties [89Lia2]. *p*: pyroelectric coefficient. F.M.: figure of merit. Θ: phase transition temperature between lower temperature rhombohedral ferroelectric and higher temperature rhombohedral ferroelectric phases.

Sample	Θ_f [°C]	κ	tan δ [%]	P_s [$\cdot 10^{-2}$ Cm^{-2}]	p [$\cdot 10^{-5}$ $Cm^{-2}K^{-1}$]	F.M.	Θ [°C] (heating)	Θ [°C] (cooling)
undoped	242	364	3.4	38.6	27.6	3.04	78	72
doped with 1 wt% MnO_2	226	210	0.46	44.0	32.8	6.77	79	69

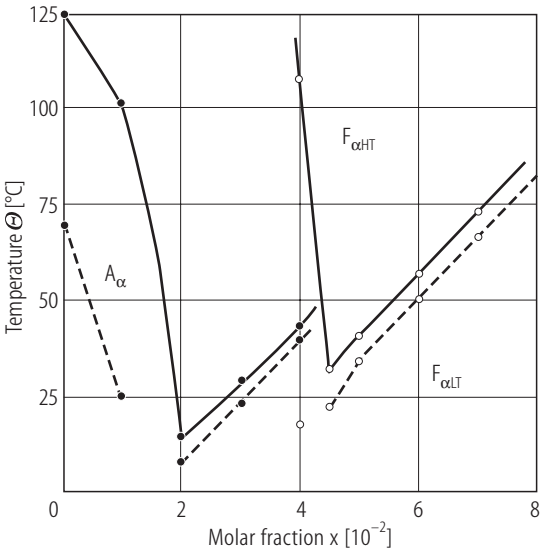

Fig. 1C-c37-001. x $PbTiO_3$·y $PbZrO_3$·z $Pb(Zn_{1/3}Nb_{2/3})O_3$ (x+y+z = 1, ceramics). Θ vs. x [89Lia2]. Θ: phase transition temperature. Open circles: z = 0. Full circles: z = 0.05. Full line: heating. Broken line: cooling.

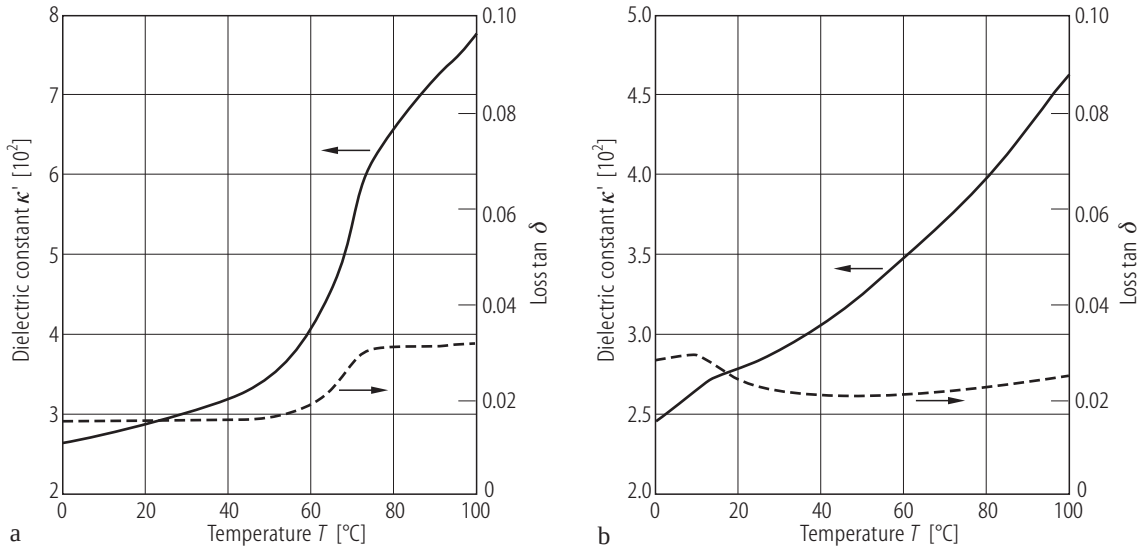

Fig. 1C-c37-002. 0.019 $PbTiO_3$·0.931 $PbZrO_3$·0.05 $Pb(Zn_{1/3}Nb_{2/3})O_3$ (ceramics). κ', $\tan\delta$ vs. T [89Lia1]. **(a)** as sintered specimen. **(b)** poled specimen.

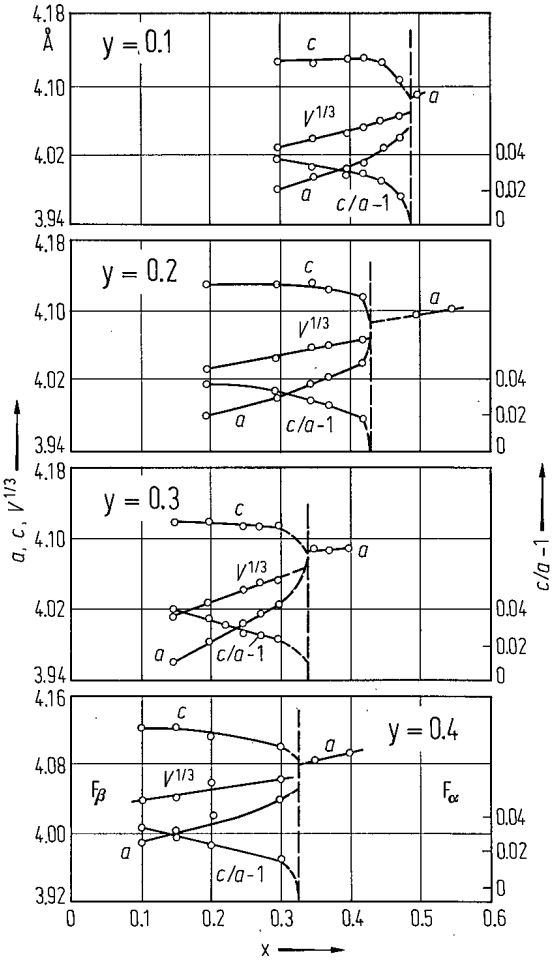

Fig. 1C-c37-003. $Pb[Ti_{1-x-y}Zr_x(Zn_{1/3}Nb_{2/3})_y]O_3$. *a*, *c*, *c*/*a*−1, $V^{1/3}$ vs. x [71Dan]. Parameter: y. $V = a^2c$.

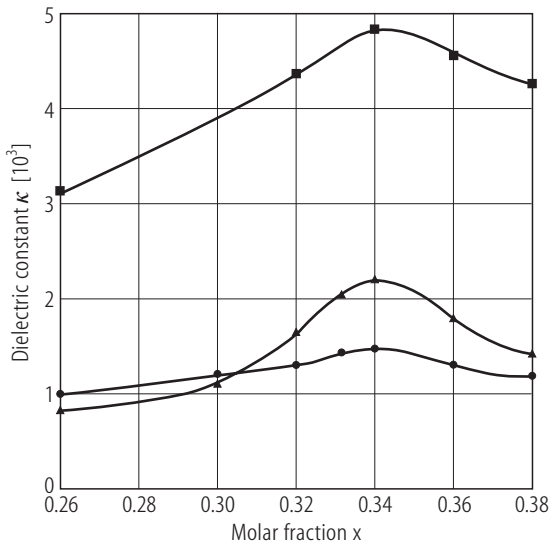

Fig. 1C-c37-004. 0.37 $Pb(Zn_{1/3}Nb_{2/3})O_3 \cdot x\ PbTiO_3 \cdot (0.63–x)\ PbZrO_3$ (ceramics). κ vs. x [92WiS]. T = RT. Circles: unpoled. Triangles: along the poling direction. Squares: perpendicular to the poling direction.

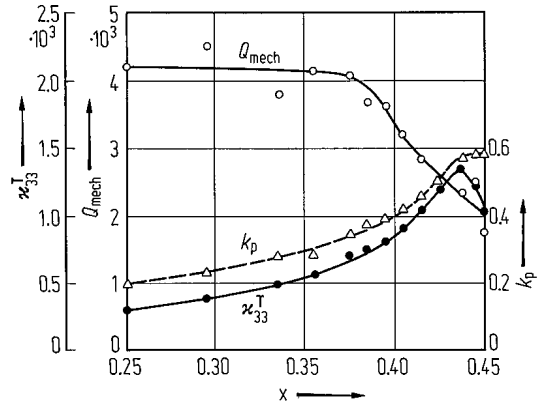

Fig. 1C-c37-005. $Pb[Ti_{0.875-x}Zr_x(Zn_{1/3}Nb_{2/3})_{0.125}]O_3$ (ceramics modified with 0.25 wt% MnO_2 and 0.5 wt% Al_2O_3). κ_{33}^T, k_p, Q_{mech} vs. x [77Nis]. f = 1 kHz for κ.

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