
No. 1C-c7 (Ca,Pb)(Ti,Zr)O₃

5 Dielectric properties: Fig. 1C-c7-001.

a Dielectric constant: Fig. 1C-c7-002.

7a Electromechanical properties: Table 1C-c7-001.

Table 1C-c7-001. $(\text{Pb}_{1-x}\text{Ca}_x)(\text{Zr}_{1-y}\text{Ti}_y)\text{O}_3$ and $(\text{Pb}_{1-x}\text{Sr}_x)(\text{Zr}_{1-y}\text{Ti}_y)\text{O}_3$ (modified ceramics). Electromechanical characteristics [59Kul].

Composition	ρ_a	κ	24 h after poling						Θ_f
			κ	$\tan \delta$	k_p	d_{31}	g_{31}	$(s_{11}^E)^{-1}$	
			at 1 kHz	[%] at 1 kHz		$[\cdot 10^{-12}$ C N $^{-1}$]	$[\cdot 10^{-3}$ m 2 C $^{-1}$]	$[\cdot 10^{10}$ N m $^{-2}$]	
$\text{Pb}(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.40	736	544	0.5	0.48	71	14.7	7.67	385
$\text{Pb}(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.39	707	542	0.4	0.47	69	14.4	7.76	
$(\text{Pb}_{0.99}\text{Ca}_{0.01})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.42	729	624	0.5	0.49	77	13.9	7.89	
$(\text{Pb}_{0.95}\text{Ca}_{0.05})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.26	832	973	0.5	0.44	88	10.2	7.62	
$(\text{Pb}_{0.92}\text{Ca}_{0.08})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	6.86	794	888	0.4	0.32	60	7.6	7.85	
$(\text{Pb}_{0.99}\text{Sr}_{0.01})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.42	755	584	0.6	0.49	75	14.5	7.68	
$(\text{Pb}_{0.95}\text{Sr}_{0.05})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.47	920	1002	0.4	0.50	101	11.4	7.65	360
$(\text{Pb}_{0.925}\text{Sr}_{0.075})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.29	942	1094	0.3	0.50	103	10.6	7.94	
$(\text{Pb}_{0.90}\text{Sr}_{0.10})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.22	997	1129	0.3	0.49	103	10.3	7.95	290
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.47}\text{Ti}_{0.53})\text{O}_3$	7.09	609	663	0.3	0.28	40	6.8	9.91	
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.50}\text{Ti}_{0.50})\text{O}_3$	7.11	813	880	0.3	0.33	57	7.3	9.05	
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.52}\text{Ti}_{0.48})\text{O}_3$	7.10	973	1149	0.3	0.44	91	9.0	8.32	
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	7.14	1076	1237	0.4	0.47	100	9.1	8.06	265
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.54}\text{Ti}_{0.46})\text{O}_3$	7.16	1095	1325	0.6	0.51	119	10.1	7.51	
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.56}\text{Ti}_{0.44})\text{O}_3$	7.14	1105	1210	0.4	0.51	116	10.8	7.31	
$(\text{Pb}_{0.875}\text{Sr}_{0.125})(\text{Zr}_{0.59}\text{Ti}_{0.41})\text{O}_3$	7.17	919	585	0.4	0.45	66	12.7	8.39	
$(\text{Pb}_{0.85}\text{Sr}_{0.15})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	6.90	1106	1260	0.5	0.43	97	8.7	7.68	242
$(\text{Pb}_{0.80}\text{Sr}_{0.20})(\text{Zr}_{0.50}\text{Ti}_{0.50})\text{O}_3$	6.56	941	970	0.6	0.29	56	6.5	8.11	
$(\text{Pb}_{0.80}\text{Sr}_{0.20})(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$	6.48	1212	1257	0.5	0.34	86	7.8	7.05	
$(\text{Pb}_{0.80}\text{Sr}_{0.20})(\text{Zr}_{0.54}\text{Ti}_{0.46})\text{O}_3$	6.36	1182	1341	0.8	0.35	91	7.7	6.18	
$(\text{Pb}_{0.80}\text{Sr}_{0.20})(\text{Zr}_{0.55}\text{Ti}_{0.45})\text{O}_3$	6.36	1200	1337	0.8	0.34	86	7.3	6.42	
$(\text{Pb}_{0.80}\text{Sr}_{0.20})(\text{Zr}_{0.56}\text{Ti}_{0.44})\text{O}_3$	6.35	1107	1113	0.7	0.35	81	8.2	6.50	

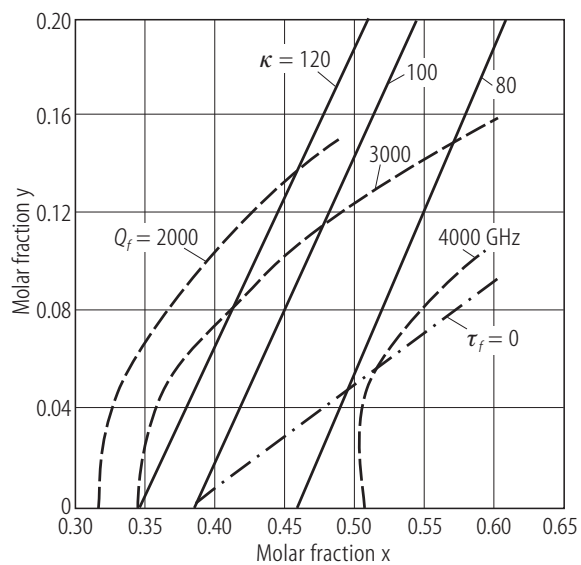


Fig. 1C-c7-001. $(\text{Pb}_{1-x}\text{Ca}_x)(\text{Zr}_{1-y}\text{Ti}_y)\text{O}_3$ (ceramics). κ , Q_f , τ_f vs. x , y at microwave frequency [93Kag]. Q_f : product of Q value and frequency. τ_f : temperature coefficient of resonant frequency.

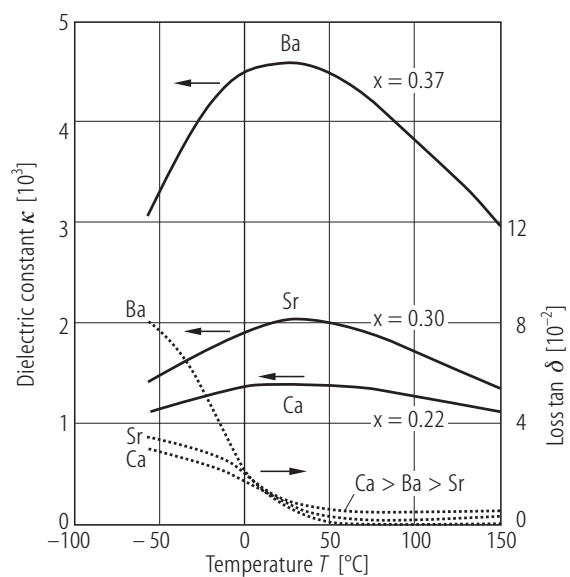


Fig. 1C-c7-002. $(\text{Pb}_{1-x}\text{X}_x)(\text{Zr}_{0.7}\text{Ti}_{0.3})\text{O}_3$ ($\text{X} = \text{Ca}, \text{Sr}, \text{Ba}$) (ceramics). κ , $\tan \delta$ vs. T [94Kan]. $f = 1$ kHz.

References

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