No. 1C-a14 $NaNbO_3$–$CdNb_2O_6$

1b	Phase diagram: Fig. 1C-a14-001; see also	57Fra
3a	Lattice parameters: see	56Lew
5a	Dielectric constant: Fig. 1C-a14-002.	
7a	Piezoelectricity: Fig. 1C-a14-003, Fig. 1C-a14-004, Table 1C-a14-001; see also	56Lew
8a	Elastic property: Table 1C-a14-002.	

Table 1C-a14-001. (Na,Cd)NbO_3 and (Na,Pb)NbO_3. Piezoelectric and dielectric properties of ceramics at 25 °C [71Jaf].

Composition	30wt% $Cd_2Nb_2O_7$ 70wt% $NaNbO_3$	25wt% $Cd_2Nb_2O_7$ 75wt% $NaNbO_3$	20wt% $Cd_2Nb_2O_7$ 80wt% $NaNbO_3$	$Na_{0.8}Cd_{0.1}NbO_3$	$Na_{0.75}Pb_{0.125}NbO_3$
κ	2400	2500	2000?	2000	320
Θ_f [°C]	215	210	320	240	235
k_p	0.31	0.34	0.33	0.30	0.19
k_{31}	0.18	0.19	0.13	0.17	
k_{33}	0.27...0.33	0.34...0.36	0.34...0.38	0.42	
d_{31} [$\cdot 10^{-12}$ C N^{-1}]	–86	–97	–42	–80	–18
d_{33} [$\cdot 10^{-12}$ C N^{-1}]	120...150	160...180	120...150	200	82
g_{31} [$\cdot 10^{-3}$ m^2 C^{-1}]	–3.6	–4.1	–3.7	–4.5	
g_{33} [$\cdot 10^{-3}$ m^2 C^{-1}]	6.0...7.1	8.1...8.2	8.5...8.8	11.3	
$1/s_{11}^{E}$ [$\cdot 10^{10}$ N m^{-2}]	10.3	9.3	11.4	9.5	
P_{max} [$\cdot 10^{-2}$ C m^{-2}]					13.5

Table 1C-a14-002. $(Na_{1-x}Cd_{x/2})NbO_3$ (ceramics). Elastic and dielectric properties [62Kel].

x	ρ [$\cdot 10^3$ kg m^{-3}]	$f_R \cdot 2r$ [$\cdot 10^3$ Hz m]	s_{11}^E [$\cdot 10^{-12}$ m^2 N^{-1}]	tan δ	κ at Θ_f [$\cdot 10^3$]
0.05	4.2	3.0	11.9	0.01	4
0.10	4.3	3.0	11.6	0.01	4.1
0.15	4.3	3.0	11.6	0.02	8.5
0.20	4.3	3.15	10.5	0.01	16
0.25	4.4	3.36	9.0	0.01	13
0.30	4.2	3.25	10.1	0.03	11

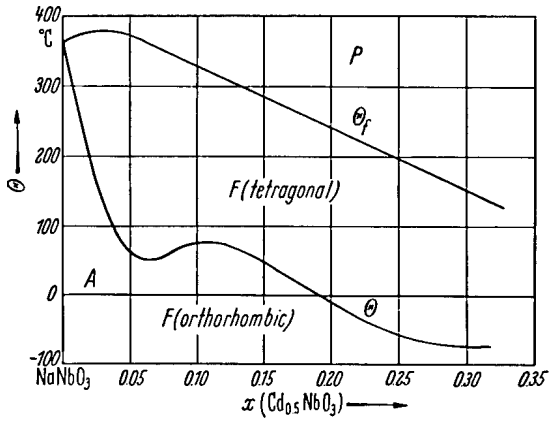

Fig. 1C-a14-001. $(Na_{1-x}Cd_{x/2})NbO_3$. Θ vs. x [56Lew, 62Kel].

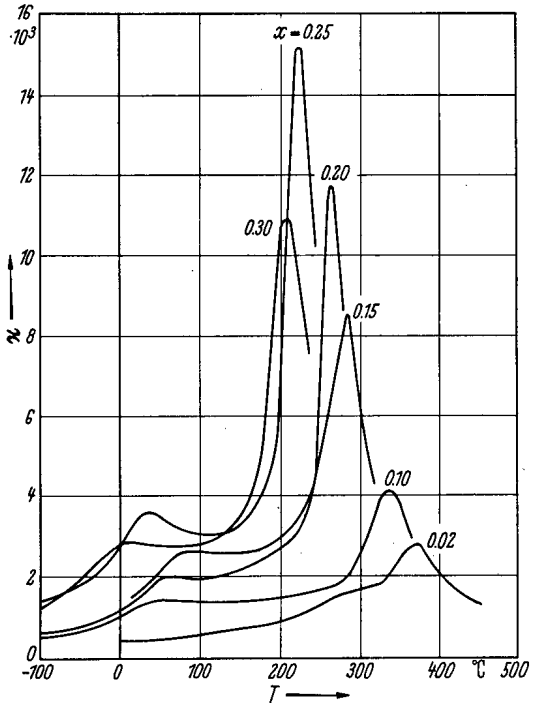

Fig. 1C-a14-002. $(Na_{1-x}Cd_{x/2})NbO_3$ (ceramics). κ vs. T [56Lew]. Parameter: x . f = 500 kHz.

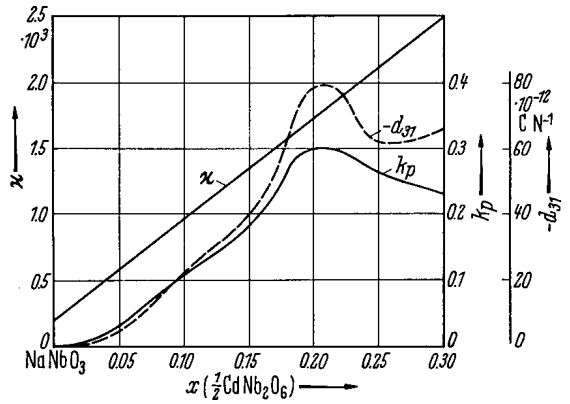

Fig. 1C-a14-003. $(Na_{1-x}Cd_{x/2})NbO_3$ (ceramics). κ, $-d_{31}$, k_p vs. x [56Lew, 62Kel]. κ at f = 500 kHz.

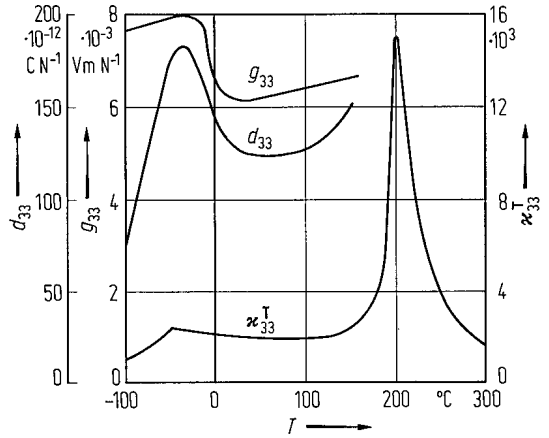

Fig. 1C-a14-004. $(Na_{0.75}Cd_{0.25/2})NbO_3$ (ceramics). κ_{33}^T, d_{33}, g_{33} vs. T [71Jaf]. κ at f = 40 Hz...4 kHz.

References

56Lew Lewis, B., White, E.A.D.: J. Electronics **1** (1956) 646.
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71Jaf Jaffe, B., Cook Jr., W.R., Jaffe, H.: Piezoelectric Ceramics, London: Academic Press, 1971.