No. 1B-c21 $Pb(Fe_{1/2}Ta_{1/2})O_3$
(M = 373.6)

1a Ferroelectricity in $Pb(Fe_{1/2}Ta_{1/2})O_3$ was discovered by Smolenskii et al. in 1959. 59Smo

b

phase	III	II	I	
state	F, A_{magn}	F, P_{magn}	P, P_{magn}	65Shv
crystal system	rhombohedral	rhombohedral	cubic	
space group			$Pm3m - O_h^1$	
Θ [K]		133, 143 [a]) (average)	233, 244 [a]) (average)	[a]) 68Nom

The transitions are diffuse phase transitions smeared around 143 and 243 K.
$P_s \parallel [111]$.
Color: Black (dark orange for thin sample). 68Nom

2a Crystal growth: flux method with PbO. When the soak temperature is higher than 1200 °C, crystal is obtained having both pyrochloride and perovskite structure. 68Nom

3a Unit cell parameters: 65Sha,
Phase I: a = 4.007(1) Å at RT. 68Nom,
Phase II: a = 4.006(1) Å, α = 89.89(2)^o at 90 K. 79Nom

4 Lattice distortion: see 79Nom

5a Dielectric constant: Figs. 1B-c21-001...1B-c21-003.
Spontaneous polarization and coercive field: Fig. 1B-c21-004.

9a Optical absorption in visible region: Fig. 1B-c21-005.
Birefringence: Fig. 1B-c21-006.

12 Magnetic susceptibility: Fig. 1B-c21-007.
p_{eff} = 5.92 μ_B; $\Theta_{p\ magn}$ = 370 K. 68Nom

13c Mössbauer effect: Fig. 1B-c21-008.

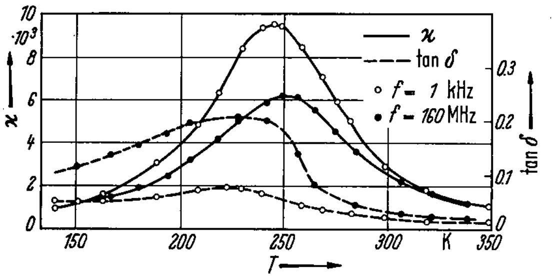

Fig. 1B-c21-001. $Pb(Fe_{1/2}Ta_{1/2})O_3$ (ceramics). *κ*, tan *δ* vs. *T* [68Nom]. Parameter: *f*.

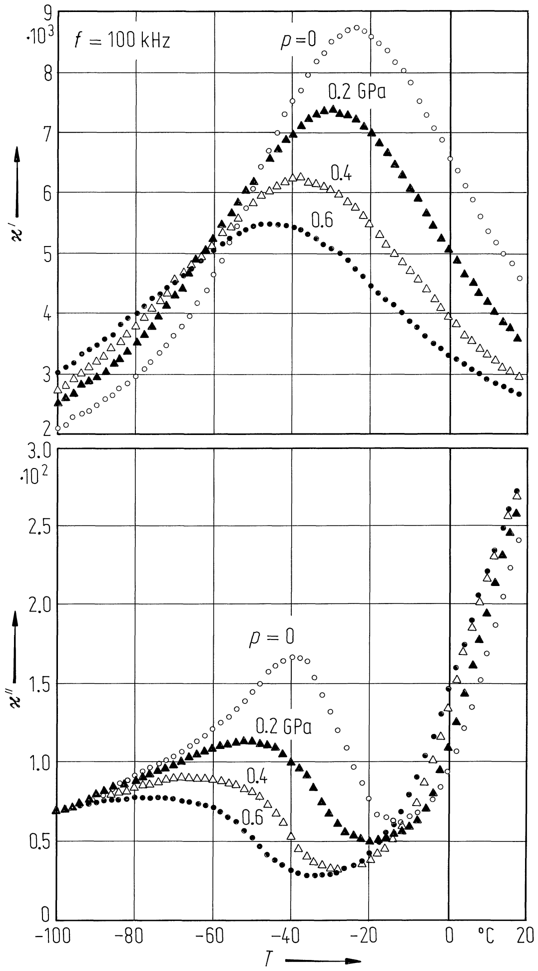

Fig. 1B-c21-002. Pb($Fe_{1/2}Ta_{1/2}$)O_3 (ceramics). κ' , κ'' vs. *T* [86Fuj]. Parameter: *p*.

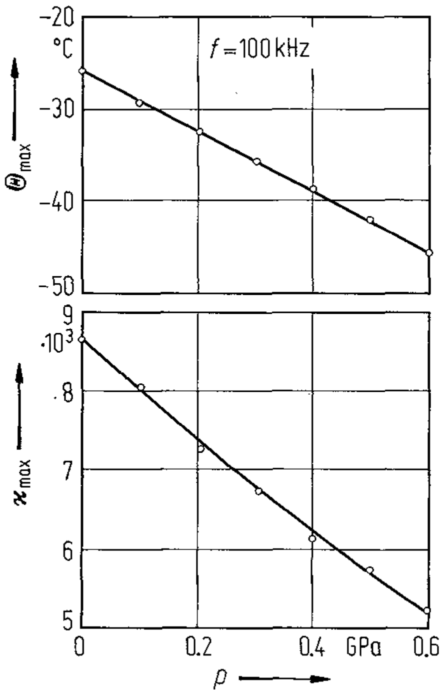

Fig. 1B-c21-003. $Pb(Fe_{1/2}Ta_{1/2})O_3$ (ceramics). Θ_{max}, κ_{max} vs. p [86Fuj]. κ_{max}: maximum dielectric constant. Θ_{max}: temperature of κ_{max}.

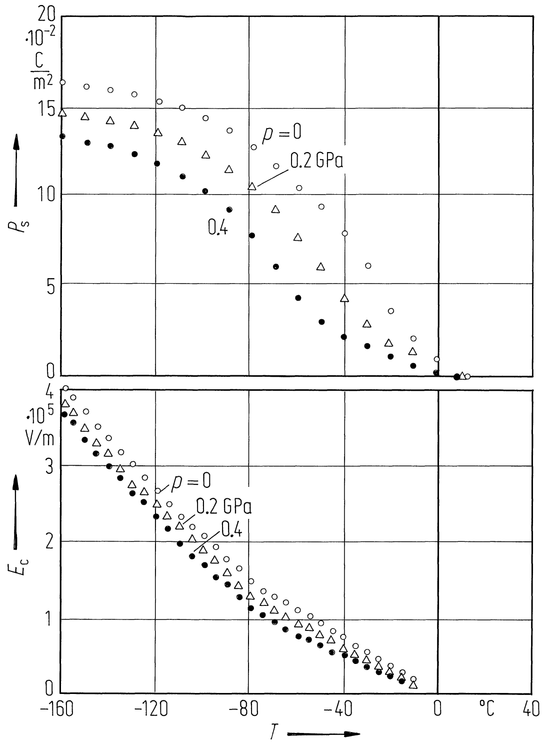

Fig. 1B-c21-004. Pb($Fe_{1/2}Ta_{1/2}$)O_3 (ceramics). P_s, E_c vs. T [86Fuj]. Parameter: p.

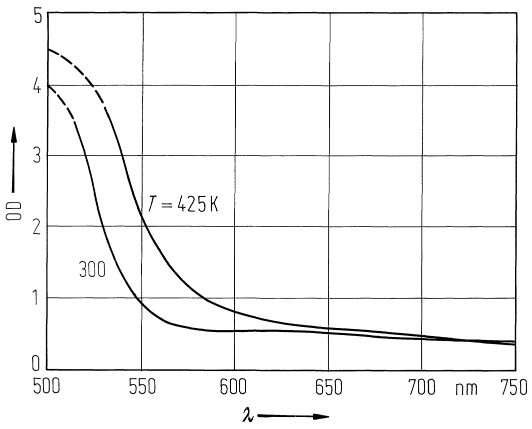

Fig. 1B-c21-005. $Pb(Fe_{1/2}Ta_{1/2})O_3$. OD vs. λ [84Bri]. OD: optical density (= log I_0/I). Sample: (110) cut, 42 μm thick.

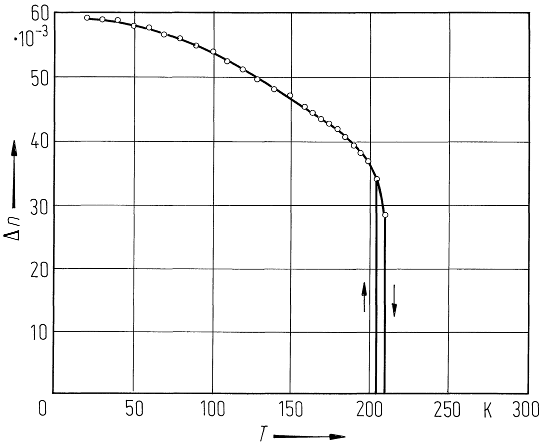

Fig. 1B-c21-006. $Pb(Fe_{1/2}Ta_{1/2})O_3$. Δn vs. T [84Bri].
$\Delta n = n_\gamma - n_\alpha$. $\lambda = 543$ nm.

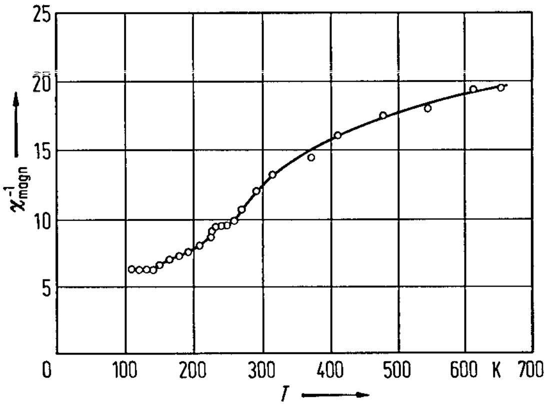

Fig. 1B-c21-007. $Pb(Fe_{1/2}Ta_{1/2})O_3$ (ceramics). χ^{-1}_{magn} vs. T [65Shv].

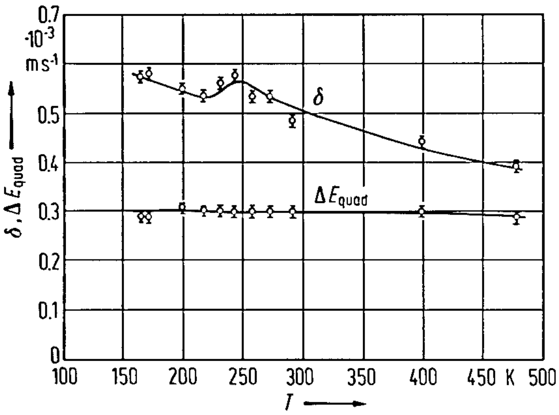

Fig. 1B-c21-008. $Pb(Fe_{1/2}Ta_{1/2})O_3$ (ceramics). δ, ΔE_{quad} vs. T [79Nom].

References

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84Bri Brixel, W., Rivera, J.-P., Schmid, H.: Ferroelectrics **55** (1984) 181.
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