No. 48A-2 $K_4Fe(CN)_6 \cdot 3H_2O$, Potassium ferrocyanide trihydrate

(M = 422.39; [D: 428.43])

1a Ferroelectricity was discovered by Waku et al. in 1959. 59Wak

b

phase	II	I
state	F	P
crystal system	monoclinic	monoclinic
space group	$Cc-C_s^4$	$C2/c-C_{2h}^6$

Θ_f [°C]	–24.5	64Kir
	[D: –18.0]	60Wak2

$P_s \parallel [10\bar{1}]$. 59Wak

$\rho = 1.89 \cdot 10^3$ kg m^{-3}. 59Wak

Transparent, yellow. 59Wak

2a Evaporation or cooling method using aqueous solution. 59Wak
Solubility in water: Table 48A-2-001.

b Crystal form: Fig. 48A-2-001.

3a Unit cell parameters:
a = 9.39(6) Å, b = 16.8(6) Å, c = 9.41(3) Å, β = 90° 3′ at RT (phase I). 64Kir
a = 9.35 Å, b = 16.7 Å, c = 9.37 Å, β = 90° 6′ at –90 °C (phase II).
There is a tetragonal modification which is not ferroelectric: a = 9.41 Å, c = 33.67 Å, 60Toy
space group: $I4_1/a-C_{4h}^6$.
The tetragonal form is irreversibly transformed to the monoclinic form, when cooled down to low temperatures, e.g. –55 °C. 60Toy

b Crystal structure: Table 48A-2-002; Fig. 48A-2-002.
Crystal structure of deuterated salt: Table 48A-2-003; Fig. 48A-2-003.

5a Dielectric constant: Fig. 48A-2-004, Fig. 48A-2-005, Fig. 48A-2-006.
Several dielectric peaks often observed at lower temperatures are due to the irreversible transformations between monoclinic and tetragonal forms. 66Kra
Pressure effect on the dielectric properties: Fig. 48A-2-007, Fig. 48A-2-008.
$d\Theta_f/dp = 2.3 \cdot 10^{-8}$ K Pa^{-1}. 66Kra

c Spontaneous polarization and coercive field: Fig. 48A-2-009, Fig. 48A-2-010.
$P_s = 1.4 \cdot 10^{-2}$ C m^{-2} at –80 °C. 60Wak1
[D: $P_s = 1.5 \cdot 10^{-2}$ C m^{-2} at –40 °C]. 60Wak2

6a Heat capacity: Fig. 48A-2-011.
Transition heat and entropy: Q_m = 2592 J mol^{-1} [D: 3017 J mol^{-1}], 75Ogu
S_m = 12.41 J K^{-1} mol^{-1} [D: 14.36 J K^{-1} mol^{-1}].

8a Sound velocity: Fig. 48A-2-012.
$v_l^{[010]}$ = 4137(29) m s^{-1}, $v_l^{[101]} \approx v_l^{[10\bar{1}]}$ = 4108(15) m s^{-1} at 20 °C. 67Sch

9a Refractive indices and optical axial angle: Table 48A-2-004.
Infrared absorption: Fig. 48A-2-013.

10a Raman scattering: Fig. 48A-2-014; see also 77Sav2

11 Electrical conductivity: Fig. 48A-2-015.
Activation energy: ΔU = 0.53 eV ($T < \Theta_f$), 0.30 eV ($T > \Theta_f$). 72Amo

13a	NMR: Table 48A-2-005; Fig. 48A-2-016, Fig. 48A-2-017; see also	61Bli, 67ORe, 72Kub
b	ESR: Fig. 48A-2-018; see also	76Sas
c	Mössbauer effect: Fig. 48A-2-019; see also	72Kis, 75Kob, 76Pla
14a	Neutron scattering: Fig. 48A-2-020.	
15a	Domain structures: see	71Kra