No. 30A-2 KNO_3, Potassium nitrate

(M = 101.10)

1a Ferroelectricity in KNO_3 was discovered by Sawada et al. in 1958. 58Saw

b

phase	II	III	I
state		F	P
crystal system	orthorhombic	trigonal	trigonal
space group	Pnma– D_{2h}^{16} [a])	R3m– C_{3v}^{5} [b])	R$\bar{3}$m – D_{3d}^{6} [c])

[a]) 31Edw
[b]) 39Bar
[c]) 47Tah

Transition temperatures: 61Saw

	phase	II	I
on heating	Θ [K]	403	

	phase	II	III *)	I
on cooling	Θ [K]	388	398	

P_s || [111]. 61Saw
T_{melt} = 606 K. 60Sch
$\rho = 2.109 \cdot 10^3$ kg m^{-3} at RT. 31Edw
Transparent, colorless.

*) Phase III is metastable at atmospheric pressure and appears only on cooling.
See also: Fig. 30A-2-013.

2a Crystal growth: cooling or evaporation of aqueous solution;
solubility in H_2O: Table 30A-2-001.
Preparation of thin film: see 83Yas, 87Sco

b Crystal form: Fig. 30A-2-001.

3a Unit cell parameters: Table 30A-2-002.

b

phase	I	II	III	IV *)
Z	1 [a])	2 [b])	1 [c])	4 [d])

[a]) 47Tah
[b]) 31Edw
[c]) 39Bar
[d]) 69Wei

*) High pressure phase: see Fig. 30A-2-013.

Crystal structure:
Structure of phase II (RT phase): Table 30A-2-003, Table 30A-2-004;
Fig. 30A-2-002, Fig. 30A-2-003, Fig. 30A-2-004.
Structures of phases I and III: Table 30A-2-005, Table 30A-2-006;
Fig. 30A-2-005, Fig. 30A-2-006.
Space group of high pressure phase IV: Pnma– D_{2h}^{16}. 86Wor
Structure of phase IV: Table 30A-2-007; Fig. 30A-2-007.

4 Thermal expansion: Table 30A-2-008; Fig. 30A-2-008, Fig. 30A-2-009.
Pressure dependence of unit cell parameters: Table 30A-2-009; Fig. 30A-2-010.

5a Dielectric constant: Fig. 30A-2-011.
Curie-Weiss behavior: Fig. 30A-2-012;
$\kappa_c = C/(T - \Theta_p)$, $T > \Theta_{III-I}$ with $C = 5.62 \cdot 10^3$ K, Θ_p = 308 K. κ_c: the dielectric constant along the trigonal [111] direction. 61Saw
Phase diagram with regard to p: Fig. 30A-2-013.

	Dielectric properties of thin film: see	83Yas, 87Dim
b	Non-linear dielectric property: $E = (1/\chi_p)P + \xi P^3 + \zeta P^5$ with $\xi = -7.75 \cdot 10^{11}$ V m^5 C^{-3}, $\zeta = 6.48 \cdot 10^{13}$ V m^9 C^{-5}.	71Mid
c	Spontaneous polarization and coercive field: Fig. 30A-2-014, Fig. 30A-2-015. Spontaneous polarization at high pressure: Fig. 30A-2-016.	
6a	Heat capacity: Fig. 30A-2-017, Fig. 30A-2-018. Transition heats and transition entropies: Table 30A-2-010; see also	30Kra
b	Thermal conductivity: Fig. 30A-2-019.	
8a	Elastic stiffnesses: Table 30A-2-011; see also	71Mic
9a	Refractive indices: Table 30A-2-012; Fig. 30A-2-020. Birefringence: Fig. 30A-2-021. Far infrared spectra: Fig. 30A-2-022, Fig. 30A-2-023, Fig. 30A-2-024; see also	71Hil, 79Hai, 80Aki
10a	Raman scattering of lattice mode frequencies: Fig. 30A-2-025, Fig. 30A-2-026, Fig. 30A-2-027; see also	80Aki, 82Med, 87Sco, 88Tse, 92Liu
	Raman scattering of thin film: see	88Sco
	Raman scattering at high pressure: Fig. 30A-2-028; see also	90She
11	Electrical conductivity: Fig. 30A-2-029. Relaxation time of complex conductivity: Fig. 30A-2-030.	
13b	ESR of VO^{2+}-doped KNO_3: see	68Rao, 70Rao
	ESR of irradiated crystals: see	62Cun, 62Zel, 64Liv, 67Hol
c	Mössbauer effect: Fig. 30A-2-031.	
14b	Diffuse X-ray scattering: Fig. 30A-2-032, Fig. 30A-2-033. Phonon dispersion: Fig. 30A-2-034.	
15b	Domain switching: Fig. 30A-2-035, Fig. 30A-2-036; see also	64Dor
	Domain switching of thin film: see	87Dim
16	Radiation damage: see	67Ges