No. 40A-2 $RbHSO_4$, Rubidium hydrogen sulfate

(M = 182.54; [D: 183.55])

1a Ferroelectricity of $RbHSO_4$ was found by Pepinsky et al. in 1960. 60Pep

b

phase	II	I	60Pep
state	F	P	
crystal system	monoclinic	monoclinic	
space group	$Pc-C_s^2$	$P2_1/c-C_{2h}^5$	
Θ [°C]	–9.4		75Chi

Θ_{II-I} of deuterated crystal was reported as –22 °C. 74Kas
P_s || [001]
$\rho_X = 1.734 \cdot 10^3$ kg m^{-3}. 75Ash
Transparent, colorless. 60Pep
Cleavage plane: (001). 60Pep
Before 1960, the crystal was believed to belong to the orthorhombic system. In this pseudoorthorhombic lattice, the space group is $B2_1/a$ and the volume of the pseudo-unit cell is twice that of the true unit cell. The ferroelectric transition temperature is first reported to be 5 °C by Pepinsky et al. Chihara et al. reported –9.4 °C from the heat capacity measurement. 60Pep, 75Chi

2a Crystal growth: slow cooling or slow evapolation from aqueous solution containing equimolar ratio of Rb_2SO_4 and H_2SO_4. 62Mya

3a Unit cell parameters at RT: a = 14.354(14) Å, b = 4.618(7) Å, c = 14.808(13) Å, β = 120.92(16)°. In the pseudoorthorhombic lattice, the crystallographic axes designated as a', b' and c' lie along the [201], [010] and [001] directions, respectively. 75Ash
a' = 24.612 Å, b' = 4.622 Å, c' = 14.807 Å, β = 90°3′. 95Ito

b Z = 8 in phase I. 70Ash
Crystal structure of phase I:
Projection on (010): Fig. 40A-2-001.
Geometry of the two hydrogen bonds: Fig. 40A-2-002.
Fractional coordinates: Table 40A-2-001.
Anisotropic temperature factors: Table 40A-2-002.
Interatomic distances and angles: Table 40A-2-003, Table 40A-2-004.
Distances between rubidium and oxygen at 23 °C: Table 40A-2-005.
Arrangement of $SO_4(1)$ ion: Fig. 40A-2-003.

5a Dielectric constant:
Temperature dependence at 10 kHz: Fig. 40A-2-004, Fig. 40A-2-005, Fig. 40A-2-006.
Frequency dependence from $10 \cdot 10^3$ Hz to $9.5 \cdot 10^9$ Hz: Fig. 40A-2-007, Fig. 40A-2-008.
Frequency dependence from $8.72 \cdot 10^9$ Hz to $7.85 \cdot 10^{10}$ Hz: Fig. 40A-2-009, Fig. 40A-2-010.
Frequency dependence from $1.18 \cdot 10^{11}$ Hz to $3.66 \cdot 10^{11}$ Hz: Fig. 40A-2-011.
Frequency dependence from $1.18 \cdot 10^{11}$ Hz to $5.10 \cdot 10^{11}$ Hz:Fig. 40A-2-012.
Frequency dependence at constant temperature: Fig. 40A-2-013, Fig. 40A-2-014.
For deuterated crystal: Fig. 40A-2-015, Fig. 40A-2-016.
Dielectric relaxation time τ: Fig. 40A-2-017.
$\kappa = C/(T - \Theta_p)$: $T \geq \Theta_f$, C = 144 K, Θ_p = –8 °C. 77Kaj
See also 78Nak
Effect of hydrostatic pressure: Fig. 40A-2-018.

	Θ–p phase diagram: Fig. 40A-2-019, Fig. 40A-2-020. $d\Theta_{II–I}/dp = 12.0(1) \cdot 10^{-8}$ K Pa^{-1}. For deuterated crystal: $d\Theta_{II–I}/dp = 12.7(2) \cdot 10^{-8}$ K Pa^{-1}.	75Ges
b	Nonlinear dielectric properties: $\xi = 7.2 \cdot 10^{14}$ V C^{-3} m^5, $\zeta = 4.2 \cdot 10^{19}$ V C^{-5} m^9.	77Kaj
c	Spontaneous polarization: Fig. 40A-2-021, Fig. 40A-2-022, Fig. 40A-2-023. Coercive field: Fig. 40A-2-024.	
6a	Heat capacity: Fig. 40A-2-025. $\Delta S = 0.91(8)$ J K^{-1} mol^{-1}. See also	 76Ale 76Fle
8a	Elastic stiffness constant at $10 \cdot 10^6$ Hz: Fig. 40A-2-026. Ultrasonic velocity: at $5 \cdot 10^6$ Hz: Fig. 40A-2-027; at $10 \cdot 10^6$ Hz: Fig. 40A-2-028. Ultrasonic attenuation at $10 \cdot 10^6$ Hz: Fig. 40A-2-029.	
9a	Refractive index: $n_\beta = 1.473$ for $\lambda = 589$ nm. Optical axial angle: $2V = 55° 52'$. Infrared spectra, see	 31Win 31Win, 72Mie
b	Electrooptic effect: see	79Web
10a	Raman scattering spectra in a low frequency region: Fig. 40A-2-030; in a high frequency region: Fig. 40A-2-031.	
b	Brillouin scattering frequency shifts and widths: Fig. 40A-2-032.	
13a	NMR: Table 40A-2-006, Table 40A-2-007, Table 40A-2-008. Spin-lattice relaxation time of ^{1}H: Fig. 40A-2-033. ^{85}Rb nuclear quadrupole resonance: Table 40A-2-009.	
15a	Striped domains were observed by X-ray topography.	83Kla