No. 39A-17 Rb_2ZnBr_4, Rubidium tetrabromozincate
(M = 555.94)

1a	Ferroelectricity in Rb_2ZnBr_4 was discovered by Sawada et al. in 1977.	77Saw

b

phase	V	IV	III	II *)	I	77Saw
state	(F) [a]	(F, AF) [a] [b]	F			[a]) 91Yam
crystal system		monoclinic [c]	orthorhombic		orthorhombic	[b]) 82Yam
space group			$P2_1cn–C_{2v}^9$		$Pmcn–D_{2h}^{16}$	[c]) 94Kas

Θ [K]: 76.5 [d]) 111.7 [d]) 193.6 [d]) 347 [d]) — [d]) 83Nom

Another phase was reported to exist below about 50 K, see Fig. 39A-17-004, Fig. 39A-17-007, Fig. 39A-17-008, Fig. 39A-17-020;
see also — 80Ras

*) Incommensurate structural modulation was reported along the [001] direction. See 14a.

P_s || [100] in phase III and IV. — 77Saw, 91Yam
Antiferroelectric axis in phase IV: || [010]. — 82Yam
P_s lies in (010) in phase V. — 91Yam
T_{melt} = 753 K. — 77Saw
Colorless. — 77Saw
Cleavage plane: (010). — 82Yam
Phase diagram in regard to p: Fig. 39A-17-001;
for the low temperature region, some different results were reported: see — 87Ale, 92Par, 93Kit1

2a Crystal growth: solution growth from aqueous solution or melt growth. — 77Saw

3a Two kinds of settings are currently used for the choice of the unit cell vectors:
1: (***a***, ***b***, ***c***), ***a*** || $\boldsymbol{P}_s$ in phase III. Space group of phase I: Pmcn.
2: (***a′***, ***b′***, ***c′***), ***b′*** || $\boldsymbol{P}_s$ in phase III. Space group of phase I: Pcmn.
In the following, the choice of setting is additionally written when the case 2 is used.
Unit cell parameters:
phase I: a = 7.666(3) Å, b = 13.380(2) Å, c = 9.728(1) Å at 368(3) K. — 91Nov
phase II: a = 7.648(2) Å, b = 13.321(1) Å, c = 9.691(1) Å at 293 K for the average structure. — 95Nov
phase III: a = 7.594(4) Å, b = 13.198(5) Å, c = 28.842(9) Å at 140 K. — 88Hog
phase IV, V: $a \approx 2a_I$, $b \approx 2b_I$, $c \approx 3c_I$; see Fig. 39A-17-002 for β. — 94Kas

b Z = 4 in phase I. — 79deP1
Positional and temperature parameters: Table 39A-17-001, Table 39A-17-002, Table 39A-17-003, Table 39A-17-004, Table 39A-17-005;
see also — 95Nov, 96Aze
Interatomic distances and angles: Table 39A-17-006.

4 Lattice distortion: Fig. 39A-17-002.
Thermal expansion: Fig. 39A-17-003; see also — 95She1

5a Dielectric constant: Fig. 39A-17-004, Fig. 39A-17-005, Fig. 39A-17-006, Fig. 39A-17-007, Fig. 39A-17-008;
see also — 78deP1, 81Saw, 81van

	Effect of p: Fig. 39A-17-009; see also Fig. 39A-2-015 in No. 39A-2. Memory effect: Fig. 39A-17-010. Thermal hysteresis of κ_a: see	81Ham
b	Effect of E_{bias} on κ: Fig. 39A-17-011.	
c	Spontaneous polarization and antiferroelectric polarization: Fig. 39A-17-012, Fig. 39A-17-013, Fig. 39A-17-014, Fig. 39A-17-015; see also	78deP1, 81Ham, 81Saw, 82Yam
	Coercive field: Fig. 39A-17-015. Step-like hysteresis loop observed at 0.004 Hz: see	88Kro
6a	Heat capacity: Fig. 39A-17-016, Fig. 39A-17-017. Transition heat, transition entropy: Table 39A-17-007.	
8a	Elastic stiffnesses: Table 39A-17-008. Sound velocities: Fig. 39A-17-018.	
9a	Refractive indices:	

T [K]	λ [nm]	n_a	n_b	n_c	
297(1)	634	1.6518(4)	1.6448(2)	1.6573(2)	88Mee
293	589	1.6596(3)	1.6523(3)	1.6642(4)	88Kus
297(1)	514.5	1.666	1.659	1.672	88Mee

	Birefringence: Fig. 39A-17-019; see also	88Kus, 88Mee, 92Ort
	Far-infrared transmission spectra: Fig. 39A-17-020. Ultraviolet transmission spectra: see	84Ras
b	Electrooptic effect and photorefractive effect: Fig. 39A-17-021, Fig. 39A-17-022.	
c	Piezooptic effect: Fig. 39A-17-023.	
d	Optical activity: see	88Mee, 92Ort, 94Kob
10a	Raman scattering: Fig. 39A-17-024, Fig. 39A-17-025; see also	80Fra
b	Brillouin scattering: Fig. 39A-17-026, Fig. 39A-17-027, Fig. 39A-17-028, Fig. 39A-17-029.	
11	Photoconductivity: Fig. 39A-17-030.	
13a	NMR spectra and spin-lattice relaxation time: Fig. 39A-17-031, Fig. 39A-17-032, Fig. 39A-17-033, Fig. 39A-17-034, Fig. 39A-17-035; see also	83Ale, 86Bli2 87Wal, 91Wal
	^{87}Rb quadrupole coupling tensor: Table 39A-17-009; see also	82Rut, 83Ale, 87Wal

	NQR: Fig. 39A-17-036; see also	86Ale, 88Bon
	NQR under high pressure: Fig. 39A-17-037; see also	87Ale
14a	The diffraction peaks in phase II and III are indexed by four integers *hklm* defined as $\boldsymbol{Q} = h\boldsymbol{a}^* + k\boldsymbol{b}^* + l\boldsymbol{c}^* + m(1/3 - \delta)\boldsymbol{c}^*$, where $\boldsymbol{Q}$ is scattering vector and δ is misfit parameter. Satellite reflections due to structural modulation in phase II: Fig. 39A-17-038, Fig. 39A-17-039, Fig. 39A-17-040, Fig. 39A-17-041; see also	96Aze
	Effect of E_{bias} on the satellite reflection intensities in phase II: see	79deP2
	Intensities of reflections which appear below Θ_{IV-III}: Fig. 39A-17-042, Fig. 39A-17-043. Effect of *p* on the satellite reflections: Fig. 39A-17-044, Fig. 39A-17-045.	
	Anomalous-diffraction studies of modulated structure: see	88Mou
b	Neutron diffuse scattering: Fig. 39A-17-046; see also	78deP2
	Neutron inelastic scattering: Fig. 39A-17-047, Fig. 39A-17-048, Fig. 39A-17-049; see also	78deP2
16	Dielectric constants of specimens irradiated with $^2H^+$, $^{32}S^{9+}$ and γ-ray: see	88Ben, 95She2
	Observation of the incommensurate structure by a transmission electron microscope: see	87Izu
	Morphology of single crystals grown in phase II: see	80Jan, 83Dam1, 83Dam2