

No. 39A-10 Rb₂ZnCl₄, Rubidium tetrachlorozincate
(*M* = 378.14)

1a	Ferroelectric activity in Rb ₂ ZnCl ₄ was discovered by Sawada et al. in 1977.				77Saw
b	phase	IV ^{a)}	III	II ^{*)}	I ^{a)} 80Fra,
	state	F	F		81Ues
	crystal system	monoclinic	orthorhombic		orthorhombic
	space group	P1c1–C _s ^{2 b)}	P2 ₁ cn–C _{2v} ⁹		Pmcn–D _{2h} ¹⁶ ^{b)} 92Mas
	Θ [K]	72	192	302	
	^{*)} Incommensurately modulated phase. <i>P_s</i> [100]. <i>ρ</i> = 2.93 · 10 ³ kg m ^{–3} . Cleavage plane (010). Transparent, colorless.				82Lus
2a	Crystal growth: evaporation method from aqueous solution.				77Saw
3a	Unit cell parameters:				
	<i>a</i> = 7.276(1) Å, <i>b</i> = 12.716(2) Å, <i>c</i> = 9.256(1) Å at 50 °C (phase I).				83Ito
	<i>a</i> = 7.253(5) Å, <i>b</i> = 12.646(9) Å, <i>c</i> = 9.221(7) Å for averaged structure at 210 K (phase II).				89Hed
	<i>a</i> = 7.236(1) Å, <i>b</i> = 12.617(2) Å, <i>c</i> = 27.593(3) Å at 146 K (phase III).				89Ito
b	<i>Z</i> = 4 in phase I.				83Ito
	Crystal structure in phase I: Table 39A-10-001, Table 39A-10-002, Table 39A-10-003; Fig. 39A-10-001, Fig. 39A-10-002.				
	Average crystal structure in phase II: Table 39A-10-004, Table 39A-10-005, Table 39A-10-006;				
	see also				83Sec
	Crystal structure based on superspace group:				89Hed
	<i>Z</i> = 12 in phase III.				89Ito
	Crystal structure in phase III: Table 39A-10-007, Table 39A-10-008, Table 39A-10-009; Fig. 39A-10-003.				
4	Lattice distortion: Fig. 39A-10-004.				
5a	Dielectric constant: Fig. 39A-10-005, Fig. 39A-10-006, Fig. 39A-10-007, Fig. 39A-10-008, Fig. 39A-10-009;				
	see also				83Unr, 84Unr, 87Lev
	Cole-Cole diagrams and relaxation times: Fig. 39A-10-010, Fig. 39A-10-011, Fig. 39A-10-012;				
	see also				93Nov
	Phase diagram in regard to <i>p</i> : Fig. 39A-10-013; see also				93Kit
	[<i>d</i> Θ _{II–I} / <i>dp</i>] _{<i>p</i>=0} = 3.5 K GPa ^{–1} , [<i>d</i> Θ _{III–II} / <i>dp</i>] _{<i>p</i>=0} = –50 K GPa ^{–1} .				85Ges
	See also Fig. 39A-2-015 in No. 39A-2.				
	For <i>κ</i> in the far-infrared region, see subsection 9a.				

b	Effect of E on κ : Fig. 39A-10-014. $d\Theta_{II-V}/dE = 0.31 \cdot 10^{-5} \text{ KV}^{-1} \text{ m}$.	86Sor
c	Spontaneous polarization, coercive field and critical field: Fig. 39A-10-015, Fig. 39A-10-016, 39A-10-017, Fig. 39A-10-018.	
6a	Heat capacity: Fig. 39A-10-019, Fig. 39A-10-020, Fig. 39A-10-021; see also	90Che
b	Thermal conductivity: Fig. 39A-10-022; see also	89Str
8a	Elastic stiffness: Table 39A-10-010; Fig. 39A-10-023, Fig. 39A-10-024, Fig. 39A-10-025. Sound velocity and attenuation: Fig. 39A-10-026, Fig. 39A-10-027, Fig. 39A-10-028, Fig. 39A-10-029. See also	81Hir, 87Maa, 90Qui
	Effects of p on sound velocities: Fig. 39A-10-030, Fig. 39A-10-031, Fig. 39A-10-032, Fig. 39A-10-033, Fig. 39A-10-034.	
9a	Refractive index: Table 39A-10-011; Fig. 39A-10-035, Fig. 39A-10-036. Birefringence: Fig. 39A-10-037; see also	83Mel, 85Kro
	Dielectric spectra in far-infrared region: Fig. 39A-10-038, Fig. 39A-10-039, Fig. 39A-10-040, Fig. 39A-10-041. Optical transmission: Fig. 39A-10-042.	
b	Electrooptic effect: Table 39A-10-012; Fig. 39A-10-043, Fig. 39A-10-044; see also	83Mel
d	Gyration tensor: see	85Ues, 95Ort
e	Nonlinear optical properties: Table 39A-10-013; Fig. 39A-10-045, Fig. 39A-10-046.	
10a	Raman scattering: Fig. 39A-10-047; see also	82Qui, 85Shk
b	Brillouin scattering: Fig. 39A-10-048, Fig. 39A-10-049, Fig. 39A-10-050. Elastic stiffness determined by Brillouin scattering, see 8a.	
11	Luminescence: see Fig. 39A-9-34 in No. 39A-9.	
13a	NMR of ⁸⁷ Rb: Table 39A-10-014, Table 39A-10-015; Fig. 39A-10-051, Fig. 39A-10-052, Fig. 39A-10-053, Fig. 39A-10-054, Fig. 39A-10-055, Fig. 39A-10-056, Fig. 39A-10-057, Fig. 39A-10-058, Fig. 39A-10-059. See also	94Dol, 94Ail
	NQR of ³⁵ Cl: Fig. 39A-10-060, Fig. 39A-10-061; see also	86Ale, 90Pap, 94Sub
b	ESR of Mn ²⁺ doped crystal: Table 39A-10-016; Fig. 39A-10-062, Fig. 39A-10-063, Fig. 39A-10-064; see also ESR of Cu ²⁺ doped crystal: see ESR of X-ray irradiated crystal: see	88Hor 94Gre 88Lop

14a	Bragg reflections due to structural modulations: Fig. 39A-10-065, Fig. 39A-10-066, Fig. 39A-10-067, Fig. 39A-10-068, Fig. 39A-10-069. See also Critical exponents β , γ and ν determined by X-ray scattering: Table 39A-10-017. Neutron scattering: Fig. 39A-10-070.	85Ehs
b	Neutron inelastic scattering: Fig. 39A-10-071, Fig. 39A-10-072. See also	91Qui

15b	Transient dielectric behavior around $\Theta_{\text{III-II}}$: Fig. 39A-10-073, Fig. 39A-10-074.	
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16	Observation of the incommensurate superlattice by a transmission electron microscope: see	86Bes, 88Tsu
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