No. 39A-18 $(NH_4)_2ZnBr_4$, Ammonium tetrabromozincate

(M = 421.08)

1a Ferroelectricity of $(NH_4)_2ZnBr_4$ was discovered independently by Moskalev et al. [a]) and Osaka et al. [b]) in 1982. — [a]) 82Mos, [b]) 82Osa

b

phase	IV	III	II [a]) *)	I
state	F			
crystal system	orthorhombic	monoclinic		orthorhombic
space group	$P2_1cn-C_{2v}^{9}$ [b])	$P2_1/c11-C_{2h}^{5}$ [b])		$Pmcn-D_{2h}^{16}$ [b])
Θ [°C]		–56.5 [a])	122 [a])	159 [a])

82Mos, 82Osa; [a]) 83Sat; [b]) 93Shi

*) Incommensurate structural modulation was reported along the [001] direction. See subsection 14a. — 83Sat

P_s || [100] — 82Mos, 82Osa

Transparent, colorless. Cleavage plane: (010). — 82Osa

$\rho_X = 2.881 \cdot 10^3$ kg m^{-3} at 25 °C. — 93Shi

2a Crystal growth: evaporation method from aqueous solution. — 82Osa

3a Unit cell parameters: Table 39A-18-001.

b Z in each phase: Table 39A-18-001.
Positional and temperature parameters: Table 39A-18-002, Table 39A-18-003, Table 39A-18-004.
Interatomic distances and angles: Table 39A-18-005, Table 39A-18-006, Table 39A-18-007.
Crystal structures: Fig. 39A-18-001, Fig. 39A-18-002, Fig. 39A-18-003.

5a Dielectric constant: Fig. 39A-18-004.

c Spontaneous polarization: Fig. 39A-18-005.

9a Reflection and absorption in far-infrared and infrared region: see — 91Sri

10a Raman scattering: see — 84Moo, 86Bis

13a NQR: Fig. 39A-18-006.
NMR: see — 89Mad, 92Ram

b ESR of $(NH_4)_2ZnBr_4:Mn^{2+}$: see — 89Mad

14a Structural modulation in phase II: Fig. 39A-18-007; see also — 94Mas
In the temperature range of III–IV phase transition, additional reflections which belong neither to phase III nor to phase IV are sometimes observed. Some of the extra reflections are assigned by modulation wave vectors $2\boldsymbol{c}^*/7$ and $3\boldsymbol{c}^*/7$. — 94Mas, 93Shi