

No. 43A-8 K₂Mn₂(SO₄)₃, Potassium manganese sulfate
 (*M* = 476.25)

1a	A phase transition in $\text{K}_2\text{Mn}_2(\text{SO}_4)_3$ was found by Hikita et al. in 1977.				77Hik
b	phase	III	II	I	78Hik
	state	A_{magn}		P	88Oel
	crystal system	orthorhombic	orthorhombic	cubic	
	space group		$\text{P2}_1\text{2}_1\text{2}_1\text{-D}_2^4$	$\text{P2}_1\text{3-T}^4$	
	θ [K]	1.75		201	
Phase transition temperature: see Table 43A-2-001 in No. 43A-2. See also Table 43A-13-001 in No. 43A-13.					
2a	Crystal growth: evaporation from aqueous solution at about 80 °C.				77Hik
b	Crystal habit: Fig. 43A-8-001.				77Hik
3a	Unit cell parameter: $a = 10.114 \text{ \AA}$ at RT; $a = 10.082 \text{ \AA}$, $b = 10.103 \text{ \AA}$, $c = 10.039 \text{ \AA}$ at $-85 \text{ }^\circ\text{C}$. Unit cell parameters: $a = 10.114 \text{ \AA}$ at $20 \text{ }^\circ\text{C}$; $a = 10.081 \text{ \AA}$, $b = 10.108 \text{ \AA}$, $c = 10.048 \text{ \AA}$ at $-90 \text{ }^\circ\text{C}$. Bond valence sum for atoms: see Table 43A-2-002 in No. 43A-2.				78Yam
b	Crystal structure: Table 43A-8-001, Table 43A-8-002, Table 43A-8-003, Table 43A-8-004, Table 43A-8-005, Table 43A-8-006, Table 43A-8-007, Table 43A-8-008, Table 43A-8-009, Table 43A-8-010, Table 43A-8-011; Fig. 43A-8-002, Fig. 43A-8-003, Fig. 43A-8-004, Fig. 43A-8-005, Fig. 43A-8-006, Fig. 43A-8-007, Fig. 43A-8-008, Fig. 43A-8-009, Fig. 43A-8-010. See also Table 43A-16-003 in No. 43A-16.				81Yam
4	Thermal expansion: Fig. 43A-8-011, Fig. 43A-8-012.				
5a	Dielectric constant : Fig. 43A-8-013, Fig. 43A-8-014. Hydrostatic pressure effect on dielectric constant: Fig. 43A-8-015. Phase diagram in regard to pressure: Fig. 43A-8-016. $(d\theta/dp)_{p=0}$: Table 43A-8-012.				
6a	Specific heat: Fig. 43A-8-017. Transition entropy: see Table 43A-13-002 in No. 43A-13.				
8a	Elastic compliance: Fig. 43A-8-013 in subsection 5a; see also Elastic stiffnesses: Fig. 43A-8-018.				79Mae
9a	Birefringence: Fig. 43A-8-019. Absorption: Table 43A-8-013, Table 43A-8-014; Fig. 43A-8-020.				
b	Electrooptic constant: $r_{41} = 2.0(2) \cdot 10^{-12} \text{ m V}^{-1}$ for $\lambda = 453 \text{ nm}$.				68Emm
c	Piezooptic constant: $p_{11} - p_{12} \cong p_{11} - p_{13} = -0.020(5)$ at RT.				78Yam
d	Circular dichroism: Fig. 43A-8-021. Optical activity: Fig. 43A-8-022.				
10a	Raman scattering: Table 43A-8-014; Fig. 43A-8-023. See also Table 43A-13-009, Table 43A-13-010 in No. 43A-13-				

43 Langbeinite ($\text{K}_2\text{Mg}_2(\text{SO}_4)_3$) family

- 12 It was found by neutron scattering that there is an antiferromagnetic phase transition at $T_N = 1.75$ K. One of the orthorhombic cell edges of the low temperature langbeinite structure is doubled below T_N .
Magnetic structure: Fig. 43A-8-024.
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- 13b ESR of Mn^{2+} : Fig. 43A-8-025.
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