

No. 31A-5 $\text{CsH}_3(\text{SeO}_3)_2$, Cesium trihydrogen selenite $(M = 389.85; [D: 392.87])$

1a	Dielectric anomaly associated with a phase transition was observed and possibility of antiferroelectricity was first reported by Makita et al. in 1962.	62Mak, 65Mak															
	<table> <tr> <th>phase</th><th>II</th><th>I</th></tr> <tr> <td>state</td><td>(A)^{a)}</td><td>P^{a)}</td></tr> <tr> <td>crystal system</td><td>triclinic^{b)}</td><td>triclinic^{b)}</td></tr> <tr> <td>space group</td><td>$P\bar{1}-C_i^{1b})^*)$</td><td>$P\bar{1}-C_i^{1b})$</td></tr> <tr> <td>$\Theta [^\circ\text{C}]$</td><td colspan="2">-128^{b)}</td></tr> </table>	phase	II	I	state	(A) ^{a)}	P ^{a)}	crystal system	triclinic ^{b)}	triclinic ^{b)}	space group	$P\bar{1}-C_i^{1b})^*)$	$P\bar{1}-C_i^{1b})$	$\Theta [^\circ\text{C}]$	-128 ^{b)}		^{a)} 62Mak ^{b)} 65Mak
phase	II	I															
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$\Theta [^\circ\text{C}]$	-128 ^{b)}																
	Isotope effect: Fig. 31A-5-001. $\rho_X = 3.76 \cdot 10^3 \text{ kg m}^{-3}$. Transparent, colorless. Deliquescent.) Phase II has superstructure: length of the c axis is twice as large as that in phase I.	74Tel															
2a	Crystal growth: slow evaporation from aqueous solution of CsOH and H_2SeO_3 in stoichiometric proportion of one mole of CsOH and two moles of H_2SeO_3 .	65Mak															
3a	Unit cell parameters: $a = 9.3474(5) \text{ \AA}$, $b = 6.5398(4) \text{ \AA}$, $c = 5.8498(3) \text{ \AA}$, $\alpha = 91.443(6)^\circ$, $\beta = 105.336(6)^\circ$, $\gamma = 91.629(6)^\circ$ at RT; see also Phase II has superlattice structure with $c_{II} \approx 2c_I$ (c_I : c in phase I).	74Tel 65Mak															
b	$Z = 2$ in phase II. Crystal structure: Table 31A-5-001, Table 31A-5-002; Fig. 31A-5-002; see also	65Mak 74Tel, 72Sat															
4	Lattice distortion: Fig. 31A-5-003. Thermal expansion coefficient: Fig. 31A-5-004.																
5a	Dielectric constants: Fig. 31A-5-005, Fig. 31A-5-006, Fig. 31A-5-007. $\kappa_{[100]} = C/(T - \Theta_p)$, where $C = 1.14 \cdot 10^3 \text{ K}$, $\Theta_p = 65 \text{ K}$. Effect of pressure: see Table 31A-2-006; Fig. 31A-2-010 in No. 31A-2.	65Mak															
b	Bias effect on Θ : Fig. 31A-5-008.																
6a	Heat capacity: Fig. 31A-5-009. Transition entropy: $\Delta S_m = 4.51 \text{ J mol}^{-1} \text{ K}^{-1}$ for $\text{CsH}_3(\text{SeO}_3)_2$, $\Delta S_m = 5.56 \text{ J mol}^{-1} \text{ K}^{-1}$ for $\text{CsD}_3(\text{SeO}_3)_2$.	79Osa															
8a	Sound velocity: Fig. 31A-5-010.																
9a	Birefringence: Fig. 31A-5-011. Infrared absorption: Table 31A-5-003; Fig. 31A-5-012.																
13a	NMR: Table 31A-5-004, Table 31A-5-005, Table 31A-5-006; Fig. 31A-5-013, Fig. 31A-5-014. For $\text{CsD}_3(\text{SeO}_3)_2$: Table 31A-5-006, Table 31A-5-007; Fig. 31A-5-015.																