

No. 24A-2 Sn₂P₂Se₆
 ($M = 771.13$)

1a	Ferroelectricity in Sn ₂ P ₂ Se ₆ was reported by Vysochanskii et al. in 1979.			79Vys1	
b	phase	III	II *)	I	81Gom
	state	(F)		P	^{a)} 79Vys2
	crystal system	monoclinic		monoclinic	^{b)} 74Car
	space group	Pc–C _s ^{2 a)} **)		P2 ₁ /c–C _{2h} ^{5 b)} **)	^{c)} 81Gom
	Θ[K]	192 ^{c)} ...193.5 ^{d)}	218 ^{c)} ...220.5 ^{d)}		^{d)} 84Mai
	$T_{\text{melt}} = 670$ °C.				74Car
	$\rho = 5.08 \cdot 10^3$ kg m ⁻³ .				88Vor
	Color: black				74Car
	*) Incommensurately modulated structure.				85Par, 86Bar, 87Bra
	**) There are equivalent expressions of the space groups: P1n1 for Pc and P12 ₁ /n1 for P2 ₁ /c. See 1b in No. 24A-1.				
2a	Crystal growth: vapor transport with iodine.				74Car
3a	Unit cell parameters: $a = 6.827(2)$ Å, $b = 7.700(2)$ Å, $c = 11.718(3)$ Å, $\beta = 124.53(3)^\circ$ at RT (phase I). See also				74Car 88Vor
b	$Z = 2$ in phase I. Crystal structure of phase I: Table 24A-2-001, Table 24A-2-002; Fig. 24A-2-001, Fig. 24A-2-002.				74Car
4	Thermal expansion: Fig. 24A-2-003; see also Fig. 24A-2-021 in 14a. Thermal expansion coefficient: see Fig. 24B-3-004 in No. 24B-3, and also				93Mai
5a	Effect of p on dielectric constant: Fig. 24A-2-004. $d\Theta_{\text{I-I}}/dp = -156$ K GPa ⁻¹ , $d\Theta_{\text{II-II}}/dp = -245$ K GPa ⁻¹ . See also Dielectric dispersion: Fig. 24A-2-005. Phase diagram in regard to p : Fig. 24A-2-006. Effect of uniaxial stresses on $\Theta_{\text{I-I}}$ and $\Theta_{\text{II-II}}$: Fig. 24A-2-007, Fig. 24A-2-008. Effect of E_{bias} on κ and $\Theta_{\text{II-II}}$: Fig. 24A-2-009; see also Fig. 24B-2-004 in No. 24B-2. Phase diagram ($\Theta - E$): Fig. 24B-2-007 in No. 24B-2.				85Vys 85Sli
c	Spontaneous polarization obtained from pyroelectric current measurement: Fig. 24A-2-010.				
d	Pyroelectric effect: see				92Pop, 87Bra
6a	Heat capacity: Fig. 24A-2-011, Fig. 24A-2-012.				
b	Thermal conductivity: see				93AIS
8	Sound velocity and attenuation, second ultrasonic harmonic generation: Fig. 24A-2-013, Fig. 24A-2-014, Fig. 24A-2-015, Fig. 24A-2-016.				
9a	Birefringence and its temperature derivative: Fig. 24A-2-017; see also Infrared spectrum: see				92Per 83Gra

24 $\text{Sn}_2\text{P}_2\text{S}_6$ family

Absorption: Fig. 24A-1-023 in No. 24A-1. Band gap energy: see		88Lip
10a	Raman scattering: Fig. 24A-2-018, Fig. 24A-2-019, Fig. 24A-2-020.	
13a	ESR: see	93Gre
14a	Bragg reflection around $\Theta_{\text{I-I}}$ and $\Theta_{\text{II-II}}$: Fig. 24A-2-021. Diffraction pattern of Bragg and satellite reflections in phase II: Fig. 24A-2-022. Incommensurate modulation wavenumber: Fig. 24A-2-023. See also Fig. 24B-3-010 in No. 24B-3.	
b	Density of phonon states: see	94Vas