$Pb_5[Ge_2O_7][GeO_4]$	*hP*57	(174) *P*-6 – l^6kj^4hgdb

$Pb_5Ge_3O_{11}$ paraelectric [2]

Structural features: Slabs containing units of two vertex-linked GeO_4 tetrahedra (parallel to [001]) alternate with slabs containing single GeO_4 tetrahedra. See Fig. IV.90.

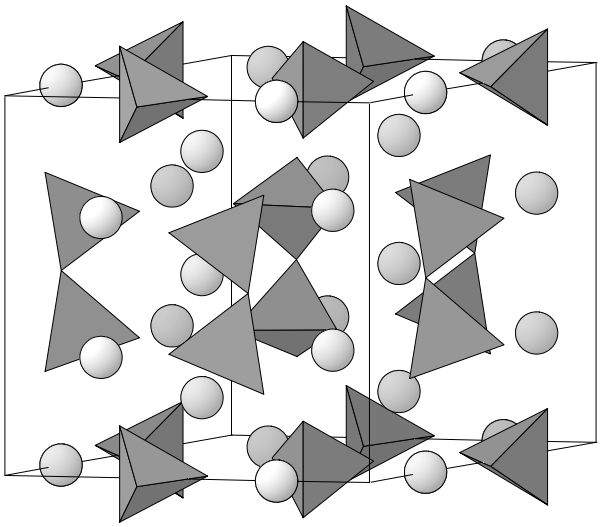

Fig. IV.90. **$Pb_5Ge_3O_{11}$ paraelectric**

Arrangement of GeO_4 tetrahedra and Pb atoms.

Iwata Y. (1977) [1]

$Ge_3O_{11}Pb_5$

a = 1.026, c = 1.0696 nm, c/a = 1.042, V = 0.9751 nm^3, Z = 3

site	Wyck.	sym.	x	y	z	occ.	atomic environment
O1	6*l*	1	0.01237	0.41503	0.127		non-colinear GePb
O2	6*l*	1	0.07637	0.22723	0.3401		single atom Ge
Ge3	6*l*	1	0.27317	0.31853	0.3486		tetrahedron O_4
O4	6*l*	1	0.34247	0.24203	0.2377		single atom Ge
O5	6*l*	1	0.35967	0.51163	0.3333		single atom Ge
Pb6	6*l*	1	0.40367	0.06933	0.3158		non-coplanar triangle O_3
O7	3*k*	*m*..	0.30807	0.26503	$^1/_2$		non-colinear Ge_2
Ge8	3*j*	*m*..	0.05787	0.33713	0		tetrahedron O_4
O9	3*j*	*m*..	0.18387	0.04443	0		single atom Ge
O10	3*j*	*m*..	0.25077	0.40703	0		non-colinear GePb
Pb11	3*j*	*m*..	0.40977	0.32763	0		6-vertex polyhedron O_6
Pb12	2*h*	3..	$^1/_3$	$^2/_3$	0.1757		tricapped trigonal prism O_9
Pb13	2*g*	3..	0	0	0.1628		octahedron O_6
Pb14	1*d*	-6..	$^1/_3$	$^2/_3$	$^1/_2$		trigonal prism O_6
Pb15	1*b*	-6..	0	0	$^1/_2$		tricapped trigonal prism O_9

Transformation from published data: $-x,-y,-z$; origin shift $^1/_3$ $^2/_3$ $^1/_2$

Experimental: single crystal, diffractometer, neutrons, R = 0.079, T = 473 K

Remarks: Phase stable at T > 450 K.

References: [1] Iwata Y. (1977), J. Phys. Soc. Jpn. 43, 961-967. [2] Newnham R.E., Wolfe R.W., Darlington C.N.W. (1973), J. Solid State Chem. 6, 378-383.