C_{4v}^{11} $I4_1md$ No. 109 $I4_1md$

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; $t(\frac{1}{2},\frac{1}{2},\frac{1}{2})$; (2); (3); (5)

General position

Multiplicity, Wyckoff letter, Site symmetry	Coordinates $(0,0,0)+$ $(\frac{1}{2},\frac{1}{2},\frac{1}{2})+$			
16 c 1	(1) x,y,z	(2) $\bar{x}+\frac{1}{2},\bar{y}+\frac{1}{2},z+\frac{1}{2}$	(3) $\bar{y},x+\frac{1}{2},z+\frac{1}{4}$	(4) $y+\frac{1}{2},\bar{x},z+\frac{3}{4}$
	(5) $x,\bar{y},z$	(6) $\bar{x}+\frac{1}{2},y+\frac{1}{2},z+\frac{1}{2}$	(7) $\bar{y},\bar{x}+\frac{1}{2},z+\frac{1}{4}$	(8) $y+\frac{1}{2},x,z+\frac{3}{4}$

I Maximal *translationengleiche* subgroups

[2] $I4_111$ (80, $I4_1$)	(1; 2; 3; 4)+		
[2] $I2m1$ (44, $Imm2$)	(1; 2; 5; 6)+		
[2] $I21d$ (43, $Fdd2$)	(1; 2; 7; 8)+	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},\mathbf{c}$	$0,1/2,0$

II Maximal *klassengleiche* subgroups

- **Loss of centring translations** none

- **Enlarged unit cell**

[3] $\mathbf{c}'=3\mathbf{c}$

$I4_1md$ (109)	$\langle 5;\ 2+(1,0,1);\ 3+(\frac{1}{2},-\frac{1}{2},\frac{1}{2})\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$1/2,0,0$

- **Series of maximal isomorphic subgroups**

[p] $\mathbf{c}'=p\mathbf{c}$

$I4_1md$ (109)	$\langle 5;\ 2+(0,0,\frac{p}{2}-\frac{1}{2});\ 3+(0,0,\frac{p}{4}-\frac{1}{4})\rangle$ prime $p>4$; $p=4n+1$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	
$I4_1md$ (109)	$\langle 5;\ 2+(1,0,\frac{p}{2}-\frac{1}{2});\ 3+(\frac{1}{2},-\frac{1}{2},\frac{p}{4}-\frac{1}{4})\rangle$ prime $p>2$; $p=4n-1$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	$1/2,0,0$

[p^2] $\mathbf{a}'=p\mathbf{a},\ \mathbf{b}'=p\mathbf{b}$

$I4_1md$ (109)	$\langle 2+(\frac{p}{2}-\frac{1}{2}+2u,\frac{p}{2}-\frac{1}{2}+2v,0);$ $3+(u+v,\frac{p}{2}-\frac{1}{2}-u+v,0);\ 5+(0,2v,0)\rangle$ prime $p>2$; $0\le u<p$; $0\le v<p$ p^2 conjugate subgroups	$p\mathbf{a},p\mathbf{b},\mathbf{c}$	$u,v,0$

I Minimal *translationengleiche* supergroups

[2] $I4_1/amd$ (141)

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations** none

- **Decreased unit cell**

[2] $\mathbf{c}'=\frac{1}{2}\mathbf{c}$ $C4_2md$ (102, $P4_2nm$)

