$I4_122$ No. 98 $I4_122$ D_4^{10}

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 g 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) $\bar{x}+\frac{1}{2},y,\bar{z}+\frac{3}{4}$	(6) $x,\bar{y}+\frac{1}{2},\bar{z}+\frac{1}{4}$	(7) $y+\frac{1}{2},x+\frac{1}{2},\bar{z}+\frac{1}{2}$	(8) $\bar{y},\bar{x},\bar{z}$

I Maximal *translationengleiche* subgroups

[2] $I4_111$ $(80, I4_1)$	(1; 2; 3; 4)+		
[2] $I2_121$ $(24, I2_12_12_1)$	(1; 2; 5; 6)+		$0,1/4,3/8$
[2] $I2_112$ $(22, F222)$	(1; 2; 7; 8)+	$\mathbf{a}-\mathbf{b},\mathbf{a}+\mathbf{b},\mathbf{c}$	

II Maximal *klassengleiche* subgroups

- **Loss of centring translations**

[2] $P4_32_12$ (96)	$1; 2; 7; 8; (3; 4; 5; 6)+(\frac{1}{2},\frac{1}{2},\frac{1}{2})$		$1/4,3/4,1/4$
[2] $P4_322$ (95)	$1; 2; 5; 6; (3; 4; 7; 8)+(\frac{1}{2},\frac{1}{2},\frac{1}{2})$		$1/4,1/4,3/8$
[2] $P4_12_12$ (92)	$1; 2; 3; 4; (5; 6; 7; 8)+(\frac{1}{2},\frac{1}{2},\frac{1}{2})$		$1/4,1/4,0$
[2] $P4_122$ (91)	1; 2; 3; 4; 5; 6; 7; 8		$3/4,1/4,3/8$

- **Enlarged unit cell**

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

$I4_122$ (98)	$\langle 2+(1,0,1); 3+(\frac{1}{2},-\frac{1}{2},\frac{1}{2}); 5+(1,0,2)\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$1/2,0,1/4$
$I4_122$ (98)	$\langle 2+(1,0,1); 3+(\frac{1}{2},-\frac{1}{2},\frac{1}{2}); 5+(1,0,4)\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$1/2,0,5/4$
$I4_122$ (98)	$\langle 2+(1,0,1); 3+(\frac{1}{2},-\frac{1}{2},\frac{1}{2}); 5+(1,0,6)\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$1/2,0,9/4$

- **Series of maximal isomorphic subgroups**

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

$I4_122$ (98)	$\langle 2+(0,0,\frac{p}{2}-\frac{1}{2}); 3+(0,0,\frac{p}{4}-\frac{1}{4}); 5+(0,0,\frac{3p}{4}-\frac{3}{4}+2u)\rangle$ prime $p>4$; $0\le u<p$ p conjugate subgroups for $p=4n+1$	$\mathbf{a},\mathbf{b},p\mathbf{c}$	$0,0,u$
$I4_122$ (98)	$\langle 2+(1,0,\frac{p}{2}-\frac{1}{2}); 3+(\frac{1}{2},-\frac{1}{2},\frac{p}{4}-\frac{1}{4}); 5+(1,0,\frac{3p}{4}-\frac{1}{4}+2u)\rangle$ prime $p>2$; $0\le u<p$ p conjugate subgroups for $p=4n-1$	$\mathbf{a},\mathbf{b},p\mathbf{c}$	$1/2,0,1/4+u$

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

$I4_122$ (98)	$\langle 2+(\frac{p}{2}-\frac{1}{2}+2u,\frac{p}{2}-\frac{1}{2}+2v,0); 3+(u+v,\frac{p}{2}-\frac{1}{2}-u+v,0); 5+(\frac{p}{2}-\frac{1}{2}+2u,0,0)\rangle$ 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); [2] $I4_1/acd$ (142); [3] $F4_132$ (210); [3] $I4_132$ (214)

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations** none

- **Decreased unit cell**

[2] $\mathbf{c}'=\frac{1}{2}\mathbf{c}$ $C4_222$ (93, $P4_222$)

