C_{2v}^{19} $Fdd2$ No. 43 $Fdd2$

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

General position

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

I Maximal *translationengleiche* subgroups

[2] $F1d1$ (9, $C1c1$)	(1; 3)+	$-\mathbf{c},\mathbf{b},1/2(\mathbf{a}+\mathbf{c})$	$0,1/8,0$
[2] $Fd11$ (9, $C1c1$)	(1; 4)+	$-\mathbf{b},\mathbf{a},1/2(\mathbf{b}+\mathbf{c})$	$1/8,0,0$
[2] $F112$ (5, $A112$)	(1; 2)+	$1/2(\mathbf{a}-\mathbf{b}),\mathbf{b},\mathbf{c}$	

II Maximal *klassengleiche* subgroups

- **Loss of centring translations** none

- **Enlarged unit cell**

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

$Fdd2$ (43)	$\langle(2;\,3)+(\frac{1}{2},\frac{1}{2},0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$1/4,1/4,0$
$Fdd2$ (43)	$\langle 2+(\frac{5}{2},\frac{1}{2},0);\,3+(\frac{1}{2},\frac{1}{2},0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$5/4,1/4,0$
$Fdd2$ (43)	$\langle 2+(\frac{9}{2},\frac{1}{2},0);\,3+(\frac{1}{2},\frac{1}{2},0)\rangle$	$3\mathbf{a},\mathbf{b},\mathbf{c}$	$9/4,1/4,0$

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

$Fdd2$ (43)	$\langle 2+(\frac{1}{2},\frac{1}{2},0);\,3+(0,1,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$1/4,1/4,0$
$Fdd2$ (43)	$\langle 2+(\frac{1}{2},\frac{5}{2},0);\,3+(0,3,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$1/4,5/4,0$
$Fdd2$ (43)	$\langle 2+(\frac{1}{2},\frac{9}{2},0);\,3+(0,5,0)\rangle$	$\mathbf{a},3\mathbf{b},\mathbf{c}$	$1/4,9/4,0$

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

$Fdd2$ (43)	$\langle 2+(\frac{1}{2},\frac{1}{2},0);\,3+(0,\frac{1}{2},\frac{1}{2})\rangle$	$\mathbf{a},\mathbf{b},3\mathbf{c}$	$1/4,1/4,0$

- **Series of maximal isomorphic subgroups**

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

$Fdd2$ (43)	$\langle 2+(\frac{1}{2}+2u,\frac{1}{2},0);\,3+(\frac{p}{4}-\frac{1}{4},\frac{1}{2},0)\rangle$ $p>2;\ 0\le u<p$ p conjugate subgroups for prime $p\equiv 3\ (\mathrm{mod}\ 4)$	$p\mathbf{a},\mathbf{b},\mathbf{c}$	$1/4+u,1/4,0$
$Fdd2$ (43)	$\langle 2+(2u,0,0);\,3+(\frac{p}{4}-\frac{1}{4},0,0)\rangle$ $p>4;\ 0\le u<p$ p conjugate subgroups for prime $p\equiv 1\ (\mathrm{mod}\ 4)$	$p\mathbf{a},\mathbf{b},\mathbf{c}$	$u,0,0$

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

$Fdd2$ (43)	$\langle 2+(\frac{1}{2},\frac{1}{2}+2u,0);\,3+(0,\frac{p}{4}+\frac{1}{4}+2u,0)\rangle$ $p>2;\ 0\le u<p$ p conjugate subgroups for prime $p\equiv 3\ (\mathrm{mod}\ 4)$	$\mathbf{a},p\mathbf{b},\mathbf{c}$	$1/4,1/4+u,0$
$Fdd2$ (43)	$\langle 2+(0,2u,0);\,3+(0,\frac{p}{4}-\frac{1}{4}+2u,0)\rangle$ $p>4;\ 0\le u<p$ p conjugate subgroups for prime $p\equiv 1\ (\mathrm{mod}\ 4)$	$\mathbf{a},p\mathbf{b},\mathbf{c}$	$0,u,0$

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

$Fdd2$ (43)	$\langle 2+(\frac{1}{2},\frac{1}{2},0);\,3+(0,\frac{1}{2},\frac{p}{4}-\frac{1}{4})\rangle$ $p>2;\ p\equiv 3\ (\mathrm{mod}\ 4)$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	$1/4,1/4,0$
$Fdd2$ (43)	$\langle 2;\,3+(0,0,\frac{p}{4}-\frac{1}{4})\rangle$ $p>4;\ p\equiv 1\ (\mathrm{mod}\ 4)$ no conjugate subgroups	$\mathbf{a},\mathbf{b},p\mathbf{c}$	

I Minimal *translationengleiche* supergroups

[2] $Fddd$ (70); [2] $I4_1md$ (109); [2] $I4_1cd$ (110); [2] $I\bar{4}2d$ (122)

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations** none

- **Decreased unit cell**

[2] $\mathbf{a}'=\frac{1}{2}\mathbf{a},\ \mathbf{b}'=\frac{1}{2}\mathbf{b},\ \mathbf{c}'=\frac{1}{2}\mathbf{c}$ $Pnn2$ (34)