$Pm\bar{3}m$ No. 221 $P4/m\bar{3}2/m$ O_h^1

Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2); (3); (5); (13); (25)

General position

Multiplicity, Wyckoff letter, Site symmetry		Coordinates							
48	n	1	(1) x,y,z	(2) $\bar{x},\bar{y},z$	(3) $\bar{x},y,\bar{z}$	(4) $x,\bar{y},\bar{z}$	(5) z,x,y	(6) $z,\bar{x},\bar{y}$	(7) $\bar{z},\bar{x},y$	(8) $\bar{z},x,\bar{y}$
			(9) y,z,x	(10) $\bar{y},z,\bar{x}$	(11) $y,\bar{z},\bar{x}$	(12) $\bar{y},\bar{z},x$	(13) $y,x,\bar{z}$	(14) $\bar{y},\bar{x},\bar{z}$	(15) $y,\bar{x},z$	(16) $\bar{y},x,z$
			(17) $x,z,\bar{y}$	(18) $\bar{x},z,y$	(19) $\bar{x},\bar{z},\bar{y}$	(20) $x,\bar{z},y$	(21) $z,y,\bar{x}$	(22) $z,\bar{y},x$	(23) $\bar{z},y,x$	(24) $\bar{z},\bar{y},\bar{x}$
			(25) $\bar{x},\bar{y},\bar{z}$	(26) $x,y,\bar{z}$	(27) $x,\bar{y},z$	(28) $\bar{x},y,z$	(29) $\bar{z},\bar{x},\bar{y}$	(30) $\bar{z},x,y$	(31) $z,x,\bar{y}$	(32) $z,\bar{x},y$
			(33) $\bar{y},\bar{z},\bar{x}$	(34) $y,\bar{z},x$	(35) $\bar{y},z,x$	(36) $y,z,\bar{x}$	(37) $\bar{y},\bar{x},z$	(38) y,x,z	(39) $\bar{y},x,\bar{z}$	(40) $y,\bar{x},\bar{z}$
			(41) $\bar{x},\bar{z},y$	(42) $x,\bar{z},\bar{y}$	(43) x,z,y	(44) $\bar{x},z,\bar{y}$	(45) $\bar{z},\bar{y},x$	(46) $\bar{z},y,\bar{x}$	(47) $z,\bar{y},\bar{x}$	(48) z,y,x

I Maximal *translationengleiche* subgroups

[2] $P\bar{4}3m$ (215)	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 37; 38; 39; 40; 41; 42; 43; 44; 45; 46; 47; 48	
[2] $P432$ (207)	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15; 16; 17; 18; 19; 20; 21; 22; 23; 24	
[2] $Pm\bar{3}1$ (200, $Pm\bar{3}$)	1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 25; 26; 27; 28; 29; 30; 31; 32; 33; 34; 35; 36	
[3] $P4/m12/m$ (123, $P4/mmm$)	1; 2; 3; 4; 13; 14; 15; 16; 25; 26; 27; 28; 37; 38; 39; 40	
[3] $P4/m12/m$ (123, $P4/mmm$)	1; 4; 2; 3; 18; 19; 17; 20; 25; 28; 26; 27; 42; 43; 41; 44	$\mathbf{b},\mathbf{c},\mathbf{a}$
[3] $P4/m12/m$ (123, $P4/mmm$)	1; 3; 4; 2; 22; 24; 23; 21; 25; 27; 28; 26; 46; 48; 47; 45	$\mathbf{c},\mathbf{a},\mathbf{b}$
[4] $P1\bar{3}2/m$ (166, $R\bar{3}m$)	1; 5; 9; 14; 19; 24; 25; 29; 33; 38; 43; 48	$\mathbf{a}-\mathbf{b},\mathbf{b}-\mathbf{c},\mathbf{a}+\mathbf{b}+\mathbf{c}$
[4] $P1\bar{3}2/m$ (166, $R\bar{3}m$)	1; 6; 12; 13; 18; 24; 25; 30; 36; 37; 42; 48	$-\mathbf{a}-\mathbf{b},\mathbf{b}+\mathbf{c},-\mathbf{a}+\mathbf{b}-\mathbf{c}$
[4] $P1\bar{3}2/m$ (166, $R\bar{3}m$)	1; 7; 10; 13; 19; 22; 25; 31; 34; 37; 43; 46	$\mathbf{a}+\mathbf{b},-\mathbf{b}+\mathbf{c},\mathbf{a}-\mathbf{b}-\mathbf{c}$
[4] $P1\bar{3}2/m$ (166, $R\bar{3}m$)	1; 8; 11; 14; 18; 22; 25; 32; 35; 38; 42; 46	$-\mathbf{a}+\mathbf{b},-\mathbf{b}-\mathbf{c},-\mathbf{a}-\mathbf{b}+\mathbf{c}$

II Maximal *klassengleiche* subgroups

- **Enlarged unit cell**

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

$Fm\bar{3}m$ (225)	$\langle 2;\ 3;\ 5;\ 13;\ 25\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	
$Fm\bar{3}c$ (226)	$\langle 2;\ 3;\ 5;\ 25;\ 13+(1,1,1)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	
$Fm\bar{3}c$ (226)	$\langle 2;\ 3;\ 5;\ 13;\ 25+(1,1,1)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$1/2,1/2,1/2$
$Fm\bar{3}m$ (225)	$\langle 2;\ 3;\ 5;\ 13+(0,0,1);\ 25+(1,1,1)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$1/2,1/2,1/2$

[4] $\mathbf{a}'=2\mathbf{a},\ \mathbf{b}'=2\mathbf{b},\ \mathbf{c}'=2\mathbf{c}$

$Im\bar{3}m$ (229)	$\langle 2;\ 3;\ 5;\ 13;\ 25\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	
$Im\bar{3}m$ (229)	$\langle 13;\ (2;\ 25)+(2,2,0);\ 3+(2,0,0);\ 5+(1,0,-1)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$1,1,0$
$Im\bar{3}m$ (229)	$\langle (2;\ 3;\ 25)+(2,0,0);\ (5;\ 13)+(1,-1,0)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$1,0,0$
$Im\bar{3}m$ (229)	$\langle 3;\ (2;\ 25)+(0,2,0);\ 5+(0,1,-1);\ 13+(-1,1,0)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$0,1,0$
$Im\bar{3}m$ (229)	$\langle 5;\ 25;\ (2;\ 13)+(0,0,1);\ 3+(0,1,0)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$1/2,1/2,1/2$
$Im\bar{3}m$ (229)	$\langle 2+(2,2,1);\ 3+(2,1,0);\ 5+(1,0,-1);\ 13+(0,0,1);\ 25+(2,2,0)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$3/2,3/2,1/2$
$Im\bar{3}m$ (229)	$\langle 2+(2,0,1);\ 3+(2,1,0);\ 5+(1,-1,0);\ 13+(1,-1,1);\ 25+(2,0,0)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$3/2,1/2,1/2$
$Im\bar{3}m$ (229)	$\langle 2+(0,2,1);\ 3+(0,1,0);\ 5+(0,1,-1);\ 13+(-1,1,1);\ 25+(0,2,0)\rangle$	$2\mathbf{a},2\mathbf{b},2\mathbf{c}$	$1/2,3/2,1/2$

- **Series of maximal isomorphic subgroups**

[p^3] $\mathbf{a}'=p\mathbf{a},\ \mathbf{b}'=p\mathbf{b},\ \mathbf{c}'=p\mathbf{c}$

$Pm\bar{3}m$ (221)	$\langle 2+(2u,2v,0);\ 3+(2u,0,2w);\ 5+(u-w,-u+v,-v+w);$ $13+(u-v,-u+v,2w);\ 25+(2u,2v,2w)\rangle$ $p>2;\ 0\le u<p;\ 0\le v<p;\ 0\le w<p$ p^3 conjugate subgroups for the prime p	$p\mathbf{a},p\mathbf{b},p\mathbf{c}$	u,v,w

I Minimal *translationengleiche* supergroups none

II Minimal non-isomorphic *klassengleiche* supergroups

- **Additional centring translations**

[2] $Im\bar{3}m$ (229); [4] $Fm\bar{3}m$ (225)

- **Decreased unit cell** none