

$P2$

No. 3

 $P121$ C_2^1 UNIQUE AXIS b Generators selected (1); $t(1,0,0)$; $t(0,1,0)$; $t(0,0,1)$; (2)

General position

Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

2 e 1(1) x, y, z (2) \bar{x}, y, \bar{z} I Maximal *translationengleiche* subgroups[2] $P1$ (1) 1II Maximal *klassengleiche* subgroups

• Enlarged unit cell

[2] $\mathbf{b}' = 2\mathbf{b}$			
$P12_1$ (4)	$\langle 2 + (0, 1, 0) \rangle$	$\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
$P121$ (3)	$\langle 2 \rangle$	$\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
[2] $\mathbf{c}' = 2\mathbf{c}$			
$P121$ (3)	$\langle 2 \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	
$P121$ (3)	$\langle 2 + (0, 0, 1) \rangle$	$\mathbf{a}, \mathbf{b}, 2\mathbf{c}$	0, 0, 1/2
[2] $\mathbf{a}' = 2\mathbf{a}$			
$P121$ (3)	$\langle 2 \rangle$	$2\mathbf{a}, \mathbf{b}, \mathbf{c}$	
$P121$ (3)	$\langle 2 + (1, 0, 0) \rangle$	$2\mathbf{a}, \mathbf{b}, \mathbf{c}$	1/2, 0, 0
[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{c}' = 2\mathbf{c}$			
$B121$ (3, $P121$)	$\langle 2 \rangle$	$\mathbf{a} - \mathbf{c}, \mathbf{b}, 2\mathbf{c}$	
$B121$ (3, $P121$)	$\langle 2 + (0, 0, 1) \rangle$	$\mathbf{a} - \mathbf{c}, \mathbf{b}, 2\mathbf{c}$	0, 0, 1/2
[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}$			
$C121$ (5)	$\langle 2 \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	
$C121$ (5)	$\langle 2 + (1, 0, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, \mathbf{c}$	1/2, 0, 0
[2] $\mathbf{b}' = 2\mathbf{b}, \mathbf{c}' = 2\mathbf{c}$			
$A121$ (5, $C121$)	$\langle 2 \rangle$	$2\mathbf{c}, 2\mathbf{b}, -\mathbf{a} - 2\mathbf{c}$	
$A121$ (5, $C121$)	$\langle 2 + (0, 0, 1) \rangle$	$2\mathbf{c}, 2\mathbf{b}, -\mathbf{a} - 2\mathbf{c}$	0, 0, 1/2
[2] $\mathbf{a}' = 2\mathbf{a}, \mathbf{b}' = 2\mathbf{b}, \mathbf{c}' = 2\mathbf{c}$			
$F121$ (5, $C121$)	$\langle 2 \rangle$	$2\mathbf{a}, 2\mathbf{b}, -\mathbf{a} + \mathbf{c}$	
$F121$ (5, $C121$)	$\langle 2 + (1, 0, 0) \rangle$	$2\mathbf{a}, 2\mathbf{b}, -\mathbf{a} + \mathbf{c}$	1/2, 0, 0
[3] $\mathbf{b}' = 3\mathbf{b}$			
$P121$ (3)	$\langle 2 \rangle$	$\mathbf{a}, 3\mathbf{b}, \mathbf{c}$	
[3] $\mathbf{c}' = 3\mathbf{c}$			
$P121$ (3)	$\langle 2 \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	
$P121$ (3)	$\langle 2 + (0, 0, 2) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 1
$P121$ (3)	$\langle 2 + (0, 0, 4) \rangle$	$\mathbf{a}, \mathbf{b}, 3\mathbf{c}$	0, 0, 2
[3] $\mathbf{a}' = \mathbf{a} - \mathbf{c}, \mathbf{c}' = 3\mathbf{c}$			
$P121$ (3)	$\langle 2 \rangle$	$\mathbf{a} - \mathbf{c}, \mathbf{b}, 3\mathbf{c}$	
$P121$ (3)	$\langle 2 + (0, 0, 2) \rangle$	$\mathbf{a} - \mathbf{c}, \mathbf{b}, 3\mathbf{c}$	0, 0, 1
$P121$ (3)	$\langle 2 + (0, 0, 4) \rangle$	$\mathbf{a} - \mathbf{c}, \mathbf{b}, 3\mathbf{c}$	0, 0, 2
[3] $\mathbf{a}' = \mathbf{a} - 2\mathbf{c}, \mathbf{c}' = 3\mathbf{c}$			
$P121$ (3)	$\langle 2 \rangle$	$\mathbf{a} - 2\mathbf{c}, \mathbf{b}, 3\mathbf{c}$	
$P121$ (3)	$\langle 2 + (0, 0, 2) \rangle$	$\mathbf{a} - 2\mathbf{c}, \mathbf{b}, 3\mathbf{c}$	0, 0, 1
$P121$ (3)	$\langle 2 + (0, 0, 4) \rangle$	$\mathbf{a} - 2\mathbf{c}, \mathbf{b}, 3\mathbf{c}$	0, 0, 2
[3] $\mathbf{a}' = 3\mathbf{a}$			
$P121$ (3)	$\langle 2 \rangle$	$3\mathbf{a}, \mathbf{b}, \mathbf{c}$	
$P121$ (3)	$\langle 2 + (2, 0, 0) \rangle$	$3\mathbf{a}, \mathbf{b}, \mathbf{c}$	1, 0, 0
$P121$ (3)	$\langle 2 + (4, 0, 0) \rangle$	$3\mathbf{a}, \mathbf{b}, \mathbf{c}$	2, 0, 0

- Series of maximal isomorphic subgroups

[p] $\mathbf{b}' = p\mathbf{b}$ $P121$ (3)	$\langle 2 \rangle$ p prime no conjugate subgroups	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	
[p] $\mathbf{a}' = \mathbf{a} - q\mathbf{c}, \mathbf{c}' = p\mathbf{c}$ $P121$ (3)	$\langle 2 + (0, 0, 2u) \rangle$ prime $p > 2; 0 \leq q < p; 0 \leq u < p$ p conjugate subgroups for each pair of q and p	$\mathbf{a} - q\mathbf{c}, \mathbf{b}, p\mathbf{c}$	$0, 0, u$
[p] $\mathbf{a}' = p\mathbf{a}$ $P121$ (3)	$\langle 2 + (2u, 0, 0) \rangle$ prime $p > 2; 0 \leq u < p$ p conjugate subgroups	$p\mathbf{a}, \mathbf{b}, \mathbf{c}$	$u, 0, 0$

I Minimal translationengleiche supergroups

[2] $P12/m1$ (10); [2] $P12/c1$ (13); [2] $P222$ (16); [2] $P222_1$ (17); [2] $P2_12_12$ (18); [2] $C222$ (21); [2] $Pmm2$ (25); [2] $Pcc2$ (27); [2] $Pma2$ (28); [2] $Pnc2$ (30); [2] $Pba2$ (32); [2] $Pnn2$ (34); [2] $Cmm2$ (35); [2] $Ccc2$ (37); [2] $P4$ (75); [2] $P4_2$ (77); [2] $P\bar{4}$ (81); [3] $P6$ (168); [3] $P6_2$ (171); [3] $P6_4$ (172)

II Minimal non-isomorphic klassengleiche supergroups

- Additional centring translations

[2] $C121$ (5); [2] $A121$ (5, $C121$); [2] $I121$ (5, $C121$)

- Decreased unit cell

none

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- Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$ $P112$ (3)	$\langle 2 \rangle$ p prime no conjugate subgroups	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	
[p] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = -q\mathbf{a} + \mathbf{b}$ $P112$ (3)	$\langle 2 + (2u, 0, 0) \rangle$ prime $p > 2; 0 \leq q < p; 0 \leq u < p$ p conjugate subgroups for each pair of q and p	$p\mathbf{a}, -q\mathbf{a} + \mathbf{b}, \mathbf{c}$	$u, 0, 0$
[p] $\mathbf{b}' = p\mathbf{b}$ $P112$ (3)	$\langle 2 + (0, 2u, 0) \rangle$ prime $p > 2; 0 \leq u < p$ p conjugate subgroups	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$0, u, 0$

I Minimal translationengleiche supergroups

[2] $P112/m$ (10); [2] $P112/a$ (13); [2] $P222$ (16); [2] $P222_1$ (17); [2] $P2_12_12$ (18); [2] $C222$ (21); [2] $Pmm2$ (25); [2] $Pcc2$ (27); [2] $Pma2$ (28); [2] $Pnc2$ (30); [2] $Pba2$ (32); [2] $Pnn2$ (34); [2] $Cmm2$ (35); [2] $Ccc2$ (37); [2] $P4$ (75); [2] $P4_2$ (77); [2] $P\bar{4}$ (81); [3] $P6$ (168); [3] $P6_2$ (171); [3] $P6_4$ (172)

II Minimal non-isomorphic klassengleiche supergroups

- Additional centring translations

[2] $A112$ (5); [2] $B112$ (5, $A112$); [2] $I112$ (5, $A112$)

- Decreased unit cell

none

UNIQUE AXIS *c*

Generators selected (1); *t*(1,0,0); *t*(0,1,0); *t*(0,0,1); (2)

General position

Multiplicity,
Wyckoff letter,
Site symmetry

Coordinates

2 e 1

(1) *x, y, z* (2) \bar{x}, \bar{y}, z

I Maximal *translationengleiche* subgroups

[2] P1 (1) 1

II Maximal *klassengleiche* subgroups

• Enlarged unit cell

[2] c' = 2c			
P112 ₁ (4)	$\langle 2 + (0, 0, 1) \rangle$	a, b, 2c	
P112 (3)	$\langle 2 \rangle$	a, b, 2c	
[2] a' = 2a			
P112 (3)	$\langle 2 \rangle$	2a, b, c	
P112 (3)	$\langle 2 + (1, 0, 0) \rangle$	2a, b, c	1/2, 0, 0
[2] b' = 2b			
P112 (3)	$\langle 2 \rangle$	a, 2b, c	
P112 (3)	$\langle 2 + (0, 1, 0) \rangle$	a, 2b, c	0, 1/2, 0
[2] a' = 2a, b' = 2b			
C112 (3, P112)	$\langle 2 \rangle$	2a, -a + b, c	
C112 (3, P112)	$\langle 2 + (1, 0, 0) \rangle$	2a, -a + b, c	1/2, 0, 0
[2] b' = 2b, c' = 2c			
A112 (5)	$\langle 2 \rangle$	a, 2b, 2c	
A112 (5)	$\langle 2 + (0, 1, 0) \rangle$	a, 2b, 2c	0, 1/2, 0
[2] a' = 2a, c' = 2c			
B112 (5, A112)	$\langle 2 \rangle$	-2a - b, 2a, 2c	
B112 (5, A112)	$\langle 2 + (1, 0, 0) \rangle$	-2a - b, 2a, 2c	1/2, 0, 0
[2] a' = 2a, b' = 2b, c' = 2c			
F112 (5, A112)	$\langle 2 \rangle$	a - b, 2b, 2c	
F112 (5, A112)	$\langle 2 + (0, 1, 0) \rangle$	a - b, 2b, 2c	0, 1/2, 0
[3] c' = 3c			
P112 (3)	$\langle 2 \rangle$	a, b, 3c	
[3] a' = 3a			
{ P112 (3)	$\langle 2 \rangle$	3a, b, c	
{ P112 (3)	$\langle 2 + (2, 0, 0) \rangle$	3a, b, c	1, 0, 0
{ P112 (3)	$\langle 2 + (4, 0, 0) \rangle$	3a, b, c	2, 0, 0
[3] a' = 3a, b' = -a + b			
{ P112 (3)	$\langle 2 \rangle$	3a, -a + b, c	
{ P112 (3)	$\langle 2 + (2, 0, 0) \rangle$	3a, -a + b, c	1, 0, 0
{ P112 (3)	$\langle 2 + (4, 0, 0) \rangle$	3a, -a + b, c	2, 0, 0
[3] a' = 3a, b' = -2a + b			
{ P112 (3)	$\langle 2 \rangle$	3a, -2a + b, c	
{ P112 (3)	$\langle 2 + (2, 0, 0) \rangle$	3a, -2a + b, c	1, 0, 0
{ P112 (3)	$\langle 2 + (4, 0, 0) \rangle$	3a, -2a + b, c	2, 0, 0
[3] b' = 3b			
{ P112 (3)	$\langle 2 \rangle$	a, 3b, c	
{ P112 (3)	$\langle 2 + (0, 2, 0) \rangle$	a, 3b, c	0, 1, 0
{ P112 (3)	$\langle 2 + (0, 4, 0) \rangle$	a, 3b, c	0, 2, 0

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- Series of maximal isomorphic subgroups

[p] $\mathbf{b}' = p\mathbf{b}$ P121 (3)	$\langle 2 \rangle$ p prime no conjugate subgroups	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	
[p] $\mathbf{a}' = \mathbf{a} - q\mathbf{c}, \mathbf{c}' = p\mathbf{c}$ P121 (3)	$\langle 2 + (0, 0, 2u) \rangle$ prime $p > 2; 0 \leq q < p; 0 \leq u < p$ p conjugate subgroups for each pair of q and p	$\mathbf{a} - q\mathbf{c}, \mathbf{b}, p\mathbf{c}$	$0, 0, u$
[p] $\mathbf{a}' = p\mathbf{a}$ P121 (3)	$\langle 2 + (2u, 0, 0) \rangle$ prime $p > 2; 0 \leq u < p$ p conjugate subgroups	$p\mathbf{a}, \mathbf{b}, \mathbf{c}$	$u, 0, 0$

I Minimal translationengleiche supergroups

[2] $P12/m1$ (10); [2] $P12/c1$ (13); [2] $P222$ (16); [2] $P222_1$ (17); [2] $P2_12_12$ (18); [2] $C222$ (21); [2] $Pmm2$ (25); [2] $Pcc2$ (27); [2] $Pma2$ (28); [2] $Pnc2$ (30); [2] $Pba2$ (32); [2] $Pnn2$ (34); [2] $Cmm2$ (35); [2] $Ccc2$ (37); [2] $P4$ (75); [2] $P4_2$ (77); [2] $P\bar{4}$ (81); [3] $P6$ (168); [3] $P6_2$ (171); [3] $P6_4$ (172)

II Minimal non-isomorphic klassengleiche supergroups

- Additional centring translations

[2] $C121$ (5); [2] $A121$ (5, $C121$); [2] $I121$ (5, $C121$)

- Decreased unit cell

none

(Continued from the following page)

- Series of maximal isomorphic subgroups

[p] $\mathbf{c}' = p\mathbf{c}$ P112 (3)	$\langle 2 \rangle$ p prime no conjugate subgroups	$\mathbf{a}, \mathbf{b}, p\mathbf{c}$	
[p] $\mathbf{a}' = p\mathbf{a}, \mathbf{b}' = -q\mathbf{a} + \mathbf{b}$ P112 (3)	$\langle 2 + (2u, 0, 0) \rangle$ prime $p > 2; 0 \leq q < p; 0 \leq u < p$ p conjugate subgroups for each pair of q and p	$p\mathbf{a}, -q\mathbf{a} + \mathbf{b}, \mathbf{c}$	$u, 0, 0$
[p] $\mathbf{b}' = p\mathbf{b}$ P112 (3)	$\langle 2 + (0, 2u, 0) \rangle$ prime $p > 2; 0 \leq u < p$ p conjugate subgroups	$\mathbf{a}, p\mathbf{b}, \mathbf{c}$	$0, u, 0$

I Minimal translationengleiche supergroups

[2] $P112/m$ (10); [2] $P112/a$ (13); [2] $P222$ (16); [2] $P222_1$ (17); [2] $P2_12_12$ (18); [2] $C222$ (21); [2] $Pmm2$ (25); [2] $Pcc2$ (27); [2] $Pma2$ (28); [2] $Pnc2$ (30); [2] $Pba2$ (32); [2] $Pnn2$ (34); [2] $Cmm2$ (35); [2] $Ccc2$ (37); [2] $P4$ (75); [2] $P4_2$ (77); [2] $P\bar{4}$ (81); [3] $P6$ (168); [3] $P6_2$ (171); [3] $P6_4$ (172)

II Minimal non-isomorphic klassengleiche supergroups

- Additional centring translations

[2] $A112$ (5); [2] $B112$ (5, $A112$); [2] $I112$ (5, $A112$)

- Decreased unit cell

none