

SEITZ SYMBOLS for SUBPERIODIC GROUP SYMMETRY OPERATIONS

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SEITZ SYMBOLS for **FRIEZE GROUP** SYMMETRY OPERATIONS

SEITZ SYMBOLS for **ROD GROUP** SYMMETRY OPERATIONS

SEITZ SYMBOLS for **LAYER GROUP** SYMMETRY OPERATIONS

Seitz symbols for Frieze Groups

No. 1
Symmetry operations

$p1$

(1) 1
 $\{1|0\}$

No. 2
Symmetry operations

$p211$

(1) 1
 $\{1|0\}$

(2) 2 0,0
 $\{2|0\}$

No. 3
Symmetry operations

$p1m1$

(1) 1
 $\{1|0\}$

(2) m 0,y
 $\{m_{10}|0\}$

No. 4
Symmetry operations

$p11m$

(1) 1
 $\{1|0\}$

(2) m x,0
 $\{m_{01}|0\}$

No. 5
Symmetry operations

$p11g$

(1) 1
 $\{1|0\}$

(2) g x,0
 $\{m_{01}|1/2,0\}$

No. 6
Symmetry operations

$p2mm$

(1) 1
 $\{1|0\}$

(2) 2 0,0
 $\{2|0\}$

(3) m 0,y
 $\{m_{10}|0\}$

(4) m x,0
 $\{m_{01}|0\}$

No. 7
Symmetry operations

$p2mg$

(1) 1
 $\{1|0\}$

(2) 2 0,0
 $\{2|0\}$

(3) m 1/4,y
 $\{m_{10}|1/2,0\}$

(4) g x,0
 $\{m_{01}|1/2,0\}$

Seitz symbols for Rod Groups

No. 1
Symmetry operations

$p1$

(1) 1
 $\{ 1 | 0 \}$

No. 2
Symmetry operations

$p\bar{1}$

(1) 1
 $\{ 1 | 0 \}$

(2) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

No. 3
Symmetry operations

$p211$

(1) 1
 $\{ 1 | 0 \}$

(2) 2 x,0,0
 $\{ 2_{100} | 0 \}$

No. 4
Symmetry operations

$pm11$

(1) 1
 $\{ 1 | 0 \}$

(2) m 0,y,z
 $\{ m_{100} | 0 \}$

No. 5
Symmetry operations

$pc11$

(1) 1
 $\{ 1 | 0 \}$

(2) c 0,y,z
 $\{ m_{100} | 0, 0, 1/2 \}$

No. 6
Symmetry operations

$p2/m11$

(1) 1
 $\{ 1 | 0 \}$

(2) 2 x,0,0
 $\{ 2_{100} | 0 \}$

(3) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

(4) m 0,y,z
 $\{ m_{100} | 0 \}$

No. 7
Symmetry operations

$p2/c11$

(1) 1
 $\{ 1 | 0 \}$

(2) 2 x,0,1/4
 $\{ 2_{100} | 0, 0, 1/2 \}$

(3) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

(4) c 0,y,z
 $\{ m_{100} | 0, 0, 1/2 \}$

No. 8
Symmetry operations

$p112$

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,0,z
 $\{ 2_{001} | 0 \}$

No. 9 $p112_1$
Symmetry operations

(1) 1 (2) 2 (0,0,1/2) 0,0,z
{ 1 | 0 } { 2₀₀₁ | 0, 0, 1/2 }

No. 10 $p11m$
Symmetry operations

(1) 1 (2) m x,y,0
{ 1 | 0 } { m₀₀₁ | 0 }

No. 11 $p112/m$
Symmetry operations

(1) 1 (2) 2 0,0,z (3) $\bar{1}$ 0,0,0 (4) m x,y,0
{ 1 | 0 } { 2₀₀₁ | 0 } { $\bar{1}$ | 0 } { m₀₀₁ | 0 }

No. 12 $p112_1/m$
Symmetry operations

(1) 1 (2) 2 (0,0,1/2) 0,0,z (3) $\bar{1}$ 0,0,0 (4) m x,y,1/4
{ 1 | 0 } { 2₀₀₁ | 0, 0, 1/2 } { $\bar{1}$ | 0 } { m₀₀₁ | 0, 0, 1/2 }

No. 13 $p222$
Symmetry operations

(1) 1 (2) 2 0,0,z (3) 2 0,y,0 (4) 2 x,0,0
{ 1 | 0 } { 2₀₀₁ | 0 } { 2₀₁₀ | 0 } { 2₁₀₀ | 0 }

No. 14 $p222_1$
Symmetry operations

(1) 1 (2) 2 (0,0,1/2) 0,0,z (3) 2 0,y,1/4 (4) 2 x,0,0
{ 1 | 0 } { 2₀₀₁ | 0, 0, 1/2 } { 2₀₁₀ | 0, 0, 1/2 } { 2₁₀₀ | 0 }

No. 15 $pmm2$
Symmetry operations

(1) 1 (2) 2 0,0,z (3) m x,0,z (4) m 0,y,z
{ 1 | 0 } { 2₀₀₁ | 0 } { m₀₁₀ | 0 } { m₁₀₀ | 0 }

No. 16 $pcc2$
Symmetry operations

(1) 1 (2) 2 0,0,z (3) c x,0,z (4) c 0,y,z
{ 1 | 0 } { 2₀₀₁ | 0 } { m₀₁₀ | 0, 0, 1/2 } { m₁₀₀ | 0, 0, 1/2 }

No. 17 $pmc2_1$
Symmetry operations

(1) 1 (2) 2 (0,0,1/2) 0,0,z (3) c x,0,z (4) m 0,y,z
{ 1 | 0 } { 2₀₀₁ | 0, 0, 1/2 } { m₀₁₀ | 0, 0, 1/2 } { m₁₀₀ | 0 }

No. 18

 $p2mm$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $x,0,0$
 $\{ 2_{100} | 0 \}$

(3) $m \ x,y,0$
 $\{ m_{001} | 0 \}$

(4) $m \ x,0,z$
 $\{ m_{010} | 0 \}$

No. 19

 $p2cm$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $x,0,0$
 $\{ 2_{100} | 0 \}$

(3) $c \ x,0,z$
 $\{ m_{010} | 0, 0, 1/2 \}$

(4) $m \ x,y,1/4$
 $\{ m_{001} | 0, 0, 1/2 \}$

No. 20

 $p2/m2/m2/m$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $0,0,z$
 $\{ 2_{001} | 0 \}$

(3) 2 $0,y,0$
 $\{ 2_{010} | 0 \}$

(4) 2 $x,0,0$
 $\{ 2_{100} | 0 \}$

(5) $\bar{1} \ 0,0,0$
 $\{ \bar{1} | 0 \}$

(6) $m \ x,y,0$
 $\{ m_{001} | 0 \}$

(7) $m \ x,0,z$
 $\{ m_{010} | 0 \}$

(8) $m \ 0,y,z$
 $\{ m_{100} | 0 \}$

No. 21

 $p2/c2/c2/m$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $0,0,z$
 $\{ 2_{001} | 0 \}$

(3) 2 $0,y,1/4$
 $\{ 2_{010} | 0, 0, 1/2 \}$

(4) 2 $x,0,1/4$
 $\{ 2_{100} | 0, 0, 1/2 \}$

(5) $\bar{1} \ 0,0,0$
 $\{ \bar{1} | 0 \}$

(6) $m \ x,y,0$
 $\{ m_{001} | 0 \}$

(7) $c \ x,0,z$
 $\{ m_{010} | 0, 0, 1/2 \}$

(8) $c \ 0,y,z$
 $\{ m_{100} | 0, 0, 1/2 \}$

No. 22

 $p2/m2/c2_1/m$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $0,y,1/4$
 $\{ 2_{010} | 0, 0, 1/2 \}$

(3) 2 $x,0,0$
 $\{ 2_{100} | 0 \}$

(4) 2 $(0,0,1/2) \ 0,0,z$
 $\{ 2_{001} | 0, 0, 1/2 \}$

(5) $\bar{1} \ 0,0,0$
 $\{ \bar{1} | 0 \}$

(6) $c \ x,0,z$
 $\{ m_{010} | 0, 0, 1/2 \}$

(7) $m \ 0,y,z$
 $\{ m_{100} | 0 \}$

(8) $m \ x,y,1/4$
 $\{ m_{001} | 0, 0, 1/2 \}$

No. 23

 $p4$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $0,0,z$
 $\{ 2_{001} | 0 \}$

(3) $4^+ \ 0,0,z$
 $\{ 4_{001}^+ | 0 \}$

(4) $4^- \ 0,0,z$
 $\{ 4_{001}^- | 0 \}$

No. 24

 $p4_1$ **Symmetry operations**

(1) 1
 $\{ 1 | 0 \}$

(2) 2 $(0,0,1/2) \ 0,0,z$
 $\{ 2_{001} | 0, 0, 1/2 \}$

(3) $4^+ (0,0,1/4) \ 0,0,z$
 $\{ 4_{001}^+ | 0, 0, 1/4 \}$

(4) $4^- (0,0,3/4) \ 0,0,z$
 $\{ 4_{001}^- | 0, 0, 3/4 \}$

No. 25

 $p4_2$ **Symmetry operations**

- | | | | |
|--------------------|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
|--------------------|---|---|---|

No. 26

 $p4_3$ **Symmetry operations**

- | | | | |
|--------------------|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 (0,0,1/2) 0,0,z
{ 2 ₀₀₁ 0, 0, 1/2 } | (3) 4 ⁺ (0,0,3/4) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 3/4 } | (4) 4 ⁻ (0,0,1/4) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/4 } |
|--------------------|---|---|---|

No. 27

 $p\bar{4}$ **Symmetry operations**

- | | | | |
|--------------------|---|--|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}^+$ ₀₀₁ 0 } | (4) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}^-$ ₀₀₁ 0 } |
|--------------------|---|--|--|

No. 28

 $p4/m$ **Symmetry operations**

- | | | | |
|--|---|--|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) m x,y,0
{ m ₀₀₁ 0 } | (7) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}^+$ ₀₀₁ 0 } | (8) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}^-$ ₀₀₁ 0 } |

No. 29

 $p4_2/m$ **Symmetry operations**

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) m x,y,0
{ m ₀₀₁ 0 } | (7) $\bar{4}^+$ 0,0,z; 0, 0, 1/4
{ $\bar{4}^+$ ₀₀₁ 0, 0, 1/2 } | (8) $\bar{4}^-$ 0,0,z; 0, 0, 1/4
{ $\bar{4}^-$ ₀₀₁ 0, 0, 1/2 } |

No. 30

 $p422$ **Symmetry operations**

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) 2 0,y,0
{ 2 ₀₁₀ 0 } | (6) 2 x,0,0
{ 2 ₁₀₀ 0 } | (7) 2 x,x,0
{ 2 ₁₁₀ 0 } | (8) 2 x, \bar{x} , 0
{ 2 _{1$\bar{1}$0} 0 } |

No. 31

 $p4_122$ **Symmetry operations**

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 (0,0,1/2) 0,0,z
{ 2 ₀₀₁ 0, 0, 1/2 } | (3) 4 ⁺ (0,0,1/4) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/4 } | (4) 4 ⁻ (0,0,3/4) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 3/4 } |
| (5) 2 x,0,0
{ 2 ₁₀₀ 0 } | (6) 2 0,y,1/4
{ 2 ₀₁₀ 0, 0, 1/2 } | (7) 2 x,x,1/8
{ 2 ₁₁₀ 0, 0, 1/4 } | (8) 2 x, \bar{x} , 3/8
{ 2 _{1$\bar{1}0$} 0, 0, 3/4 } |

No. 32

 $p4_222$ **Symmetry operations**

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
| (5) 2 0,y,0
{ 2 ₀₁₀ 0 } | (6) 2 x,0,0
{ 2 ₁₀₀ 0 } | (7) 2 x,x,1/4
{ 2 ₁₁₀ 0, 0, 1/2 } | (8) 2 x, \bar{x} , 1/4
{ 2 _{1$\bar{1}0$} 0, 0, 1/2 } |

No. 33

 $p4_322$ **Symmetry operations**

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 (0,0,1/2) 0,0,z
{ 2 ₀₀₁ 0, 0, 1/2 } | (3) 4 ⁺ (0,0,3/4) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 3/4 } | (4) 4 ⁻ (0,0,1/4) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/4 } |
| (5) 2 x,0,0
{ 2 ₁₀₀ 0 } | (6) 2 0,y,1/4
{ 2 ₀₁₀ 0, 0, 1/2 } | (7) 2 x,x,3/8
{ 2 ₁₁₀ 0, 0, 3/4 } | (8) 2 x, \bar{x} , 1/8
{ 2 _{1$\bar{1}0$} 0, 0, 1/4 } |

No. 34

 $p4mm$ **Symmetry operations**

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) m x,0,z
{ m ₀₁₀ 0 } | (6) m 0,y,z
{ m ₁₀₀ 0 } | (7) m x, \bar{x} , z
{ m ₁₁₀ 0 } | (8) m x,x,z
{ m _{1$\bar{1}0$} 0 } |

No. 35 (first setting)

 $p4_2cm$ **Symmetry operations**

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
| (5) c x,0,z
{ m ₀₁₀ 0, 0, 1/2 } | (6) c 0,y,z
{ m ₁₀₀ 0, 0, 1/2 } | (7) m x, \bar{x} , z
{ m ₁₁₀ 0 } | (8) m x,x,z
{ m _{1$\bar{1}0$} 0 } |

No. 35 (second setting)

$p4_2mc$

Symmetry operations

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
| (5) m x,0,z
{ m ₀₁₀ 0 } | (6) m 0,y,z
{ m ₁₀₀ 0 } | (7) c x, \bar{x} , z
{ m ₁₁₀ 0, 0, 1/2 } | (8) c x,x,z
{ m _{1$\bar{1}$0} 0, 0, 1/2 } |

No. 36

$p4cc$

Symmetry operations

- | | | | |
|---|---|---|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) c x,0,z
{ m ₀₁₀ 0, 0, 1/2 } | (6) c 0,y,z
{ m ₁₀₀ 0, 0, 1/2 } | (7) c x, \bar{x} , z
{ m ₁₁₀ 0, 0, 1/2 } | (8) c x,x,z
{ m _{1$\bar{1}$0} 0, 0, 1/2 } |

No. 37 (first setting)

$p\bar{4}2m$

Symmetry operations

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}$ ₀₀₁ ⁺ 0 } | (4) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}$ ₀₀₁ ⁻ 0 } |
| (5) 2 0,y,0
{ 2 ₀₁₀ 0 } | (6) 2 x,0,0
{ 2 ₁₀₀ 0 } | (7) m x, \bar{x} , z
{ m ₁₁₀ 0 } | (8) m x,x,z
{ m _{1$\bar{1}$0} 0 } |

No. 37 (second setting)

$p\bar{4}m2$

Symmetry operations

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}$ ₀₀₁ ⁺ 0 } | (4) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}$ ₀₀₁ ⁻ 0 } |
| (5) m x,0,z
{ m ₀₁₀ 0 } | (6) m 0,y,z
{ m ₁₀₀ 0 } | (7) 2 x,x,0
{ 2 ₁₁₀ 0 } | (8) 2 x, \bar{x} , 0
{ 2 _{1$\bar{1}$0} 0 } |

No. 38 (first setting)

$p\bar{4}2c$

Symmetry operations

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}$ ₀₀₁ ⁺ 0 } | (4) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}$ ₀₀₁ ⁻ 0 } |
| (5) 2 0,y,1/4
{ 2 ₀₁₀ 0, 0, 1/2 } | (6) 2 x,0,1/4
{ 2 ₁₀₀ 0, 0, 1/2 } | (7) c x, \bar{x} , z
{ m ₁₁₀ 0, 0, 1/2 } | (8) c x,x,z
{ m _{1$\bar{1}$0} 0, 0, 1/2 } |

No. 38 (second setting)

$p\bar{4}c2$

Symmetry operations

- | | | | |
|---|---|---|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}_{001}^+$ 0 } | (4) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}_{001}^-$ 0 } |
| (5) c x,0,z
{ m ₀₁₀ 0, 0, 1/2 } | (6) c 0,y,z
{ m ₁₀₀ 0, 0, 1/2 } | (7) 2 x,x,1/4
{ 2 ₁₁₀ 0, 0, 1/2 } | (8) 2 x, \bar{x} ,1/4
{ 2 _{1$\bar{1}0$} 0, 0, 1/2 } |

No. 39

$p4/m2/m2/m$

Symmetry operations

- | | | | |
|--|--|---|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) 2 0,y,0
{ 2 ₀₁₀ 0 } | (6) 2 x,0,0
{ 2 ₁₀₀ 0 } | (7) 2 x,x,0
{ 2 ₁₁₀ 0 } | (8) 2 x, \bar{x} ,0
{ 2 _{1$\bar{1}0$} 0 } |
| (9) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (10) m x,y,0
{ m ₀₀₁ 0 } | (11) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}_{001}^+$ 0 } | (12) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}_{001}^-$ 0 } |
| (13) m x,0,z
{ m ₀₁₀ 0 } | (14) m 0,y,z
{ m ₁₀₀ 0 } | (15) m x, \bar{x} ,z
{ m ₁₁₀ 0 } | (16) m x,x,z
{ m _{1$\bar{1}0$} 0 } |

No. 40

$p4/m2/c2/c$

Symmetry operations

- | | | | |
|---|---|---|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) 2 0,y,1/4
{ 2 ₀₁₀ 0, 0, 1/2 } | (6) 2 x,0,1/4
{ 2 ₁₀₀ 0, 0, 1/2 } | (7) 2 x,x,1/4
{ 2 ₁₁₀ 0, 0, 1/2 } | (8) 2 x, \bar{x} ,1/4
{ 2 _{1$\bar{1}0$} 0, 0, 1/2 } |
| (9) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (10) m x,y,0
{ m ₀₀₁ 0 } | (11) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}_{001}^+$ 0 } | (12) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}_{001}^-$ 0 } |
| (13) c x,0,z
{ m ₀₁₀ 0, 0, 1/2 } | (14) c 0,y,z
{ m ₁₀₀ 0, 0, 1/2 } | (15) c x, \bar{x} ,z
{ m ₁₁₀ 0, 0, 1/2 } | (16) c x,x,z
{ m _{1$\bar{1}0$} 0, 0, 1/2 } |

No. 41 (first setting)

$p4_2/m2/m2/c$

Symmetry operations

- | | | | |
|--|--|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
| (5) 2 0,y,0
{ 2 ₀₁₀ 0 } | (6) 2 x,0,0
{ 2 ₁₀₀ 0 } | (7) 2 x,x,1/4
{ 2 ₁₁₀ 0, 0, 1/2 } | (8) 2 x, \bar{x} , 1/4
{ 2 _{1$\bar{1}0$} 0, 0, 1/2 } |
| (9) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (10) m x,y,0
{ m ₀₀₁ 0 } | (11) $\bar{4}^+$ 0,0,z; 0, 0, 1/4
{ $\bar{4}^+$ ₀₀₁ 0, 0, 1/2 } | (12) $\bar{4}^-$ 0,0,z; 0, 0, 1/4
{ $\bar{4}^-$ ₀₀₁ 0, 0, 1/2 } |
| (13) m x,0,z
{ m ₀₁₀ 0 } | (14) m 0,y,z
{ m ₁₀₀ 0 } | (15) c x, \bar{x} , z
{ m ₁₁₀ 0, 0, 1/2 } | (16) c x,x,z
{ m _{1$\bar{1}0$} 0, 0, 1/2 } |

No. 41 (second setting)

$p4_2/m2/c2/m$

Symmetry operations

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁺ 0, 0, 1/2 } | (4) 4 ⁻ (0,0,1/2) 0,0,z
{ 4 ₀₀₁ ⁻ 0, 0, 1/2 } |
| (5) 2 0,y,1/4
{ 2 ₀₁₀ 0, 0, 1/2 } | (6) 2 x,0,1/4
{ 2 ₁₀₀ 0, 0, 1/2 } | (7) 2 x,x,0
{ 2 ₁₁₀ 0 } | (8) 2 x, \bar{x} , 0
{ 2 _{1$\bar{1}0$} 0 } |
| (9) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (10) m x,y,0
{ m ₀₀₁ 0 } | (11) $\bar{4}^+$ 0,0,z; 0, 0, 1/4
{ $\bar{4}^+$ ₀₀₁ 0, 0, 1/2 } | (12) $\bar{4}^-$ 0,0,z; 0, 0, 1/4
{ $\bar{4}^-$ ₀₀₁ 0, 0, 1/2 } |
| (13) c x,0,z
{ m ₀₁₀ 0, 0, 1/2 } | (14) c 0,y,z
{ m ₁₀₀ 0, 0, 1/2 } | (15) m x, \bar{x} , z
{ m ₁₁₀ 0 } | (16) m x,x,z
{ m _{1$\bar{1}0$} 0 } |

No. 42

$p3$

Symmetry operations

- | | | |
|--------------------|---|---|
| (1) 1
{ 1 0 } | (2) 3 ⁺ 0,0,z
{ 3 ₀₀₁ ⁺ 0 } | (3) 3 ⁻ 0,0,z
{ 3 ₀₀₁ ⁻ 0 } |
|--------------------|---|---|

No. 43

$p3_1$

Symmetry operations

- | | | |
|--------------------|---|---|
| (1) 1
{ 1 0 } | (2) 3 ⁺ (0,0,1/3) 0,0,z
{ 3 ₀₀₁ ⁺ 0, 0, 1/3 } | (3) 3 ⁻ (0,0,2/3) 0,0,z
{ 3 ₀₀₁ ⁻ 0, 0, 2/3 } |
|--------------------|---|---|

No. 44

$p3_2$

Symmetry operations

- | | | |
|--------------------|---|---|
| (1) 1
{ 1 0 } | (2) 3 ⁺ (0,0,2/3) 0,0,z
{ 3 ₀₀₁ ⁺ 0, 0, 2/3 } | (3) 3 ⁻ (0,0,1/3) 0,0,z
{ 3 ₀₀₁ ⁻ 0, 0, 1/3 } |
|--------------------|---|---|

No. 45
Symmetry operations

$p\bar{3}$

- | | | |
|--|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (5) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (6) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |

No. 46 (first setting)
Symmetry operations

$p312$

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, \bar{x} , 0
{ $2_{\bar{1}10}$ 0 } | (5) 2 x, 2x, 0
{ 2_{120} 0 } | (6) 2 2x, x, 0
{ 2_{210} 0 } |

No. 46 (second setting)
Symmetry operations

$p321$

- | | | |
|------------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, x, 0
{ 2_{110} 0 } | (5) 2 x, 0, 0
{ 2_{100} 0 } | (6) 2 0, y, 0
{ 2_{010} 0 } |

No. 47 (first setting)
Symmetry operations

$p3_112$

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,1/3) 0,0,z
{ 3_{001}^+ 0, 0, 1/3 } | (3) 3^- (0,0,2/3) 0,0,z
{ 3_{001}^- 0, 0, 2/3 } |
| (4) 2 x, \bar{x} , 1/3
{ $2_{\bar{1}10}$ 0, 0, 2/3 } | (5) 2 x, 2x, 1/6
{ 2_{120} 0, 0, 1/3 } | (6) 2 2x, x, 0
{ 2_{210} 0 } |

No. 47 (second setting)
Symmetry operations

$p3_121$

- | | | |
|------------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,1/3) 0,0,z
{ 3_{001}^+ 0, 0, 1/3 } | (3) 3^- (0,0,2/3) 0,0,z
{ 3_{001}^- 0, 0, 2/3 } |
| (4) 2 x, x, 0
{ 2_{110} 0 } | (5) 2 x, 0, 1/3
{ 2_{100} 0, 0, 2/3 } | (6) 2 0, y, 1/6
{ 2_{010} 0, 0, 1/3 } |

No. 48 (first setting)
Symmetry operations

$p3_212$

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,2/3) 0,0,z
{ 3_{001}^+ 0, 0, 2/3 } | (3) 3^- (0,0,1/3) 0,0,z
{ 3_{001}^- 0, 0, 1/3 } |
| (4) 2 $x, \bar{x}, 1/6$
{ $2_{\bar{1}\bar{1}0}$ 0, 0, 1/3 } | (5) 2 $x, 2x, 1/3$
{ 2_{120} 0, 0, 2/3 } | (6) 2 $2x, x, 0$
{ 2_{210} 0 } |

No. 48 (second setting)
Symmetry operations

$p3_221$

- | | | |
|--------------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,2/3) 0,0,z
{ 3_{001}^+ 0, 0, 2/3 } | (3) 3^- (0,0,1/3) 0,0,z
{ 3_{001}^- 0, 0, 1/3 } |
| (4) 2 $x, x, 0$
{ 2_{110} 0 } | (5) 2 $x, 0, 1/6$
{ 2_{100} 0, 0, 1/3 } | (6) 2 $0, y, 1/3$
{ 2_{010} 0, 0, 2/3 } |

No. 49 (first setting)
Symmetry operations

$p3m1$

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x, \bar{x}, z
{ m_{110} 0 } | (5) m $x, 2x, z$
{ m_{100} 0 } | (6) m $2x, x, z$
{ m_{010} 0 } |

No. 49 (second setting)
Symmetry operations

$p31m$

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x, x, z
{ $m_{\bar{1}\bar{1}0}$ 0 } | (5) m $x, 0, z$
{ m_{120} 0 } | (6) m $0, y, z$
{ m_{210} 0 } |

No. 50 (first setting)
Symmetry operations

$p3c1$

- | | | |
|--|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) c x, \bar{x}, z
{ m_{110} 0, 0, 1/2 } | (5) c $x, 2x, z$
{ m_{100} 0, 0, 1/2 } | (6) c $2x, x, z$
{ m_{010} 0, 0, 1/2 } |

No. 50 (second setting)
Symmetry operations

$p31c$

(1) 1
 $\{ 1 | 0 \}$

(2) 3^+ 0,0,z
 $\{ 3_{001}^+ | 0 \}$

(3) 3^- 0,0,z
 $\{ 3_{001}^- | 0 \}$

(4) c x,x,z
 $\{ m_{1\bar{1}0} | 0, 0, 1/2 \}$

(5) c x,0,z
 $\{ m_{120} | 0, 0, 1/2 \}$

(6) c 0,y,z
 $\{ m_{210} | 0, 0, 1/2 \}$

No. 51 (first setting)
Symmetry operations

$p\bar{3}12/m$

(1) 1
 $\{ 1 | 0 \}$

(2) 3^+ 0,0,z
 $\{ 3_{001}^+ | 0 \}$

(3) 3^- 0,0,z
 $\{ 3_{001}^- | 0 \}$

(4) 2 x, \bar{x} , 0
 $\{ 2_{1\bar{1}0} | 0 \}$

(5) 2 x, 2x, 0
 $\{ 2_{120} | 0 \}$

(6) 2 2x, x, 0
 $\{ 2_{210} | 0 \}$

(7) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

(8) $\bar{3}^+$ 0,0,z; 0,0,0
 $\{ \bar{3}_{001}^+ | 0 \}$

(9) $\bar{3}^-$ 0,0,z; 0,0,0
 $\{ \bar{3}_{001}^- | 0 \}$

(10) m x,x,z
 $\{ m_{1\bar{1}0} | 0 \}$

(11) m x,0,z
 $\{ m_{120} | 0 \}$

(12) m 0,y,z
 $\{ m_{210} | 0 \}$

No. 51 (second setting)
Symmetry operations

$p\bar{3}2/m1$

(1) 1
 $\{ 1 | 0 \}$

(2) 3^+ 0,0,z
 $\{ 3_{001}^+ | 0 \}$

(3) 3^- 0,0,z
 $\{ 3_{001}^- | 0 \}$

(4) 2 x,x,0
 $\{ 2_{110} | 0 \}$

(5) 2 x,0,0
 $\{ 2_{100} | 0 \}$

(6) 2 0,y,0
 $\{ 2_{010} | 0 \}$

(7) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

(8) $\bar{3}^+$ 0,0,z; 0,0,0
 $\{ \bar{3}_{001}^+ | 0 \}$

(9) $\bar{3}^-$ 0,0,z; 0,0,0
 $\{ \bar{3}_{001}^- | 0 \}$

(10) m x, \bar{x} , z
 $\{ m_{110} | 0 \}$

(11) m x, 2x, z
 $\{ m_{100} | 0 \}$

(12) m 2x, x, z
 $\{ m_{010} | 0 \}$

No. 52 (first setting)
Symmetry operations

$p\bar{3}12/c$

- | | | |
|---|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, \bar{x} , 1/4
{ $2_{1\bar{1}0}$ 0, 0, 1/2 } | (5) 2 x, 2x, 1/4
{ 2_{120} 0, 0, 1/2 } | (6) 2 2x, x, 1/4
{ 2_{210} 0, 0, 1/2 } |
| (7) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (10) c x, x, z
{ $m_{1\bar{1}0}$ 0, 0, 1/2 } | (11) c x, 0, z
{ m_{120} 0, 0, 1/2 } | (12) c 0, y, z
{ m_{210} 0, 0, 1/2 } |

No. 52 (second setting)
Symmetry operations

$p\bar{3}2/c1$

- | | | |
|--|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, x, 1/4
{ 2_{110} 0, 0, 1/2 } | (5) 2 x, 0, 1/4
{ 2_{100} 0, 0, 1/2 } | (6) 2 0, y, 1/4
{ 2_{010} 0, 0, 1/2 } |
| (7) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (10) c x, \bar{x} , z
{ m_{110} 0, 0, 1/2 } | (11) c x, 2x, z
{ m_{100} 0, 0, 1/2 } | (12) c 2x, x, z
{ m_{010} 0, 0, 1/2 } |

No. 53
Symmetry operations

$p6$

- | | | |
|----------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |

No. 54
Symmetry operations

$p6_1$

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,1/3) 0,0,z
{ 3_{001}^+ 0, 0, 1/3 } | (3) 3^- (0,0,2/3) 0,0,z
{ 3_{001}^- 0, 0, 2/3 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,5/6) 0,0,z
{ 6_{001}^- 0, 0, 5/6 } | (6) 6^+ (0,0,1/6) 0,0,z
{ 6_{001}^+ 0, 0, 1/6 } |

No. 55

 $\rho 6_2$ **Symmetry operations**

- | | | |
|----------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,2/3) 0,0,z
{ 3_{001}^+ 0, 0, 2/3 } | (3) 3^- (0,0,1/3) 0,0,z
{ 3_{001}^- 0, 0, 1/3 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- (0,0,2/3) 0,0,z
{ 6_{001}^- 0, 0, 2/3 } | (6) 6^+ (0,0,1/3) 0,0,z
{ 6_{001}^+ 0, 0, 1/3 } |

No. 56

 $\rho 6_3$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |

No. 57

 $\rho 6_4$ **Symmetry operations**

- | | | |
|----------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,1/3) 0,0,z
{ 3_{001}^+ 0, 0, 1/3 } | (3) 3^- (0,0,2/3) 0,0,z
{ 3_{001}^- 0, 0, 2/3 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- (0,0,1/3) 0,0,z
{ 6_{001}^- 0, 0, 1/3 } | (6) 6^+ (0,0,2/3) 0,0,z
{ 6_{001}^+ 0, 0, 2/3 } |

No. 58

 $\rho 6_5$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,2/3) 0,0,z
{ 3_{001}^+ 0, 0, 2/3 } | (3) 3^- (0,0,1/3) 0,0,z
{ 3_{001}^- 0, 0, 1/3 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/6) 0,0,z
{ 6_{001}^- 0, 0, 1/6 } | (6) 6^+ (0,0,5/6) 0,0,z
{ 6_{001}^+ 0, 0, 5/6 } |

No. 59

 $\rho \bar{6}$ **Symmetry operations**

- | | | |
|----------------------------------|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x,y,0
{ m_{001} 0 } | (5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |

No. 60

 $p6/m$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (10) m x,y,0
{ m_{001} 0 } | (11) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (12) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |

No. 61

 $p6_3/m$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |
| (7) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (10) m x,y,1/4
{ m_{001} 0, 0, 1/2 } | (11) $\bar{6}^-$ 0,0,z; 0, 0, 1/4
{ $\bar{6}_{001}^-$ 0, 0, 1/2 } | (12) $\bar{6}^+$ 0,0,z; 0, 0, 1/4
{ $\bar{6}_{001}^+$ 0, 0, 1/2 } |

No. 62

 $p622$ **Symmetry operations**

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) 2 x,x,0
{ 2_{110} 0 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,0
{ 2_{010} 0 } |
| (10) 2 x, \bar{x} ,0
{ $2_{\bar{1}10}$ 0 } | (11) 2 x,2x,0
{ 2_{120} 0 } | (12) 2 2x,x,0
{ 2_{210} 0 } |

No. 63

 $p6_1 22$ **Symmetry operations**

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,1/3) 0,0,z
{ 3_{001}^+ 0, 0, 1/3 } | (3) 3^- (0,0,2/3) 0,0,z
{ 3_{001}^- 0, 0, 2/3 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,5/6) 0,0,z
{ 6_{001}^- 0, 0, 5/6 } | (6) 6^+ (0,0,1/6) 0,0,z
{ 6_{001}^+ 0, 0, 1/6 } |
| (7) 2 x,x,1/6
{ 2_{110} 0, 0, 1/3 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,1/3
{ 2_{010} 0, 0, 2/3 } |
| (10) 2 x, \bar{x} , 5/12
{ $2_{1\bar{1}0}$ 0, 0, 5/6 } | (11) 2 x,2x,1/4
{ 2_{120} 0, 0, 1/2 } | (12) 2 2x,x,1/12
{ 2_{210} 0, 0, 1/6 } |

No. 64

 $p6_2 22$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,2/3) 0,0,z
{ 3_{001}^+ 0, 0, 2/3 } | (3) 3^- (0,0,1/3) 0,0,z
{ 3_{001}^- 0, 0, 1/3 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- (0,0,2/3) 0,0,z
{ 6_{001}^- 0, 0, 2/3 } | (6) 6^+ (0,0,1/3) 0,0,z
{ 6_{001}^+ 0, 0, 1/3 } |
| (7) 2 x,x,1/3
{ 2_{110} 0, 0, 2/3 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,1/6
{ 2_{010} 0, 0, 1/3 } |
| (10) 2 x, \bar{x} , 1/3
{ $2_{1\bar{1}0}$ 0, 0, 2/3 } | (11) 2 x,2x,0
{ 2_{120} 0 } | (12) 2 2x,x,1/6
{ 2_{210} 0, 0, 1/3 } |

No. 65

 $p6_3 22$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |
| (7) 2 x,x,0
{ 2_{110} 0 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,0
{ 2_{010} 0 } |
| (10) 2 x, \bar{x} , 1/4
{ $2_{1\bar{1}0}$ 0, 0, 1/2 } | (11) 2 x,2x,1/4
{ 2_{120} 0, 0, 1/2 } | (12) 2 2x,x,1/4
{ 2_{210} 0, 0, 1/2 } |

No. 66

 $p6_4 22$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,1/3) 0,0,z
{ 3_{001}^+ 0, 0, 1/3 } | (3) 3^- (0,0,2/3) 0,0,z
{ 3_{001}^- 0, 0, 2/3 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- (0,0,1/3) 0,0,z
{ 6_{001}^- 0, 0, 1/3 } | (6) 6^+ (0,0,2/3) 0,0,z
{ 6_{001}^+ 0, 0, 2/3 } |
| (7) 2 x,x,1/6
{ 2_{110} 0, 0, 1/3 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,1/3
{ 2_{010} 0, 0, 2/3 } |
| (10) 2 x, \bar{x} , 1/6
{ $2_{1\bar{1}0}$ 0, 0, 1/3 } | (11) 2 x,2x,0
{ 2_{120} 0 } | (12) 2 2x,x,1/3
{ 2_{210} 0, 0, 2/3 } |

No. 67

 $p6_5 22$ **Symmetry operations**

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ (0,0,2/3) 0,0,z
{ 3_{001}^+ 0, 0, 2/3 } | (3) 3^- (0,0,1/3) 0,0,z
{ 3_{001}^- 0, 0, 1/3 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/6) 0,0,z
{ 6_{001}^- 0, 0, 1/6 } | (6) 6^+ (0,0,5/6) 0,0,z
{ 6_{001}^+ 0, 0, 5/6 } |
| (7) 2 x,x,1/3
{ 2_{110} 0, 0, 2/3 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,1/6
{ 2_{010} 0, 0, 1/3 } |
| (10) 2 x, \bar{x} , 1/12
{ $2_{1\bar{1}0}$ 0, 0, 1/6 } | (11) 2 x,2x,1/4
{ 2_{120} 0, 0, 1/2 } | (12) 2 2x,x,5/12
{ 2_{210} 0, 0, 5/6 } |

No. 68

 $p6mm$ **Symmetry operations**

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) m x, \bar{x} , z
{ m_{110} 0 } | (8) m x,2x,z
{ m_{100} 0 } | (9) m 2x,x,z
{ m_{010} 0 } |
| (10) m x,x,z
{ $m_{1\bar{1}0}$ 0 } | (11) m x,0,z
{ m_{120} 0 } | (12) m 0,y,z
{ m_{210} 0 } |

No. 69

 $p6cc$ **Symmetry operations**

- | | | |
|---|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) c x, \bar{x}, z
{ m_{110} 0, 0, 1/2 } | (8) c $x, 2x, z$
{ m_{100} 0, 0, 1/2 } | (9) c $2x, x, z$
{ m_{010} 0, 0, 1/2 } |
| (10) c x, x, z
{ $m_{1\bar{1}0}$ 0, 0, 1/2 } | (11) c $x, 0, z$
{ m_{120} 0, 0, 1/2 } | (12) c $0, y, z$
{ m_{210} 0, 0, 1/2 } |

No. 70 (first setting)

 $p6_3mc$ **Symmetry operations**

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |
| (7) m x, \bar{x}, z
{ m_{110} 0 } | (8) m $x, 2x, z$
{ m_{100} 0 } | (9) m $2x, x, z$
{ m_{010} 0 } |
| (10) c x, x, z
{ $m_{1\bar{1}0}$ 0, 0, 1/2 } | (11) c $x, 0, z$
{ m_{120} 0, 0, 1/2 } | (12) c $0, y, z$
{ m_{210} 0, 0, 1/2 } |

No. 70 (second setting)

 $p6_3cm$ **Symmetry operations**

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |
| (7) c x, \bar{x}, z
{ m_{110} 0, 0, 1/2 } | (8) c $x, 2x, z$
{ m_{100} 0, 0, 1/2 } | (9) c $2x, x, z$
{ m_{010} 0, 0, 1/2 } |
| (10) m x, x, z
{ $m_{1\bar{1}0}$ 0 } | (11) m $x, 0, z$
{ m_{120} 0 } | (12) m $0, y, z$
{ m_{210} 0 } |

No. 71 (first setting)
Symmetry operations

$p\bar{6}m2$

- | | | |
|--|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x,y,0
{ m_{001} 0 } | (5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |
| (7) m x, \bar{x} , z
{ m_{110} 0 } | (8) m x, 2x, z
{ m_{100} 0 } | (9) m 2x, x, z
{ m_{010} 0 } |
| (10) 2 x, \bar{x} , 0
{ $2_{1\bar{1}0}$ 0 } | (11) 2 x, 2x, 0
{ 2_{120} 0 } | (12) 2 2x, x, 0
{ 2_{210} 0 } |

No. 71 (second setting)
Symmetry operations

$p\bar{6}2m$

- | | | |
|---|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x,y,0
{ m_{001} 0 } | (5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |
| (7) 2 x,x,0
{ 2_{110} 0 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,0
{ 2_{010} 0 } |
| (10) m x,x,z
{ $m_{1\bar{1}0}$ 0 } | (11) m x,0,z
{ m_{120} 0 } | (12) m 0,y,z
{ m_{210} 0 } |

No. 72 (first setting)
Symmetry operations

$p\bar{6}c2$

- | | | |
|--|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x,y,0
{ m_{001} 0 } | (5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |
| (7) c x, \bar{x} , z
{ m_{110} 0, 0, 1/2 } | (8) c x, 2x, z
{ m_{100} 0, 0, 1/2 } | (9) c 2x, x, z
{ m_{010} 0, 0, 1/2 } |
| (10) 2 x, \bar{x} , 1/4
{ $2_{1\bar{1}0}$ 0, 0, 1/2 } | (11) 2 x, 2x, 1/4
{ 2_{120} 0, 0, 1/2 } | (12) 2 2x, x, 1/4
{ 2_{210} 0, 0, 1/2 } |

No. 72 (second setting)

$p\bar{6}2c$

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 3^+ 0,0,z
 $\{ 3_{001}^+ | 0 \}$

(3) 3^- 0,0,z
 $\{ 3_{001}^- | 0 \}$

(4) m x,y,0
 $\{ m_{001} | 0 \}$

(5) $\bar{6}^-$ 0,0,z; 0,0,0
 $\{ \bar{6}_{001}^- | 0 \}$

(6) $\bar{6}^+$ 0,0,z; 0,0,0
 $\{ \bar{6}_{001}^+ | 0 \}$

(7) 2 x,x,1/4
 $\{ 2_{110} | 0, 0, 1/2 \}$

(8) 2 x,0,1/4
 $\{ 2_{100} | 0, 0, 1/2 \}$

(9) 2 0,y,1/4
 $\{ 2_{010} | 0, 0, 1/2 \}$

(10) c x,x,z
 $\{ m_{1\bar{1}0} | 0, 0, 1/2 \}$

(11) c x,0,z
 $\{ m_{120} | 0, 0, 1/2 \}$

(12) c 0,y,z
 $\{ m_{210} | 0, 0, 1/2 \}$

No. 73

$p6/m2/m2/m$

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 3^+ 0,0,z
 $\{ 3_{001}^+ | 0 \}$

(3) 3^- 0,0,z
 $\{ 3_{001}^- | 0 \}$

(4) 2 0,0,z
 $\{ 2_{001} | 0 \}$

(5) 6^- 0,0,z
 $\{ 6_{001}^- | 0 \}$

(6) 6^+ 0,0,z
 $\{ 6_{001}^+ | 0 \}$

(7) 2 x,x,0
 $\{ 2_{110} | 0 \}$

(8) 2 x,0,0
 $\{ 2_{100} | 0 \}$

(9) 2 0,y,0
 $\{ 2_{010} | 0 \}$

(10) 2 x, \bar{x} ,0
 $\{ 2_{1\bar{1}0} | 0 \}$

(11) 2 x,2x,0
 $\{ 2_{120} | 0 \}$

(12) 2 2x,x,0
 $\{ 2_{210} | 0 \}$

(13) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

(14) $\bar{3}^+$ 0,0,z; 0,0,0
 $\{ \bar{3}_{001}^+ | 0 \}$

(15) $\bar{3}^-$ 0,0,z; 0,0,0
 $\{ \bar{3}_{001}^- | 0 \}$

(16) m x,y,0
 $\{ m_{001} | 0 \}$

(17) $\bar{6}^-$ 0,0,z; 0,0,0
 $\{ \bar{6}_{001}^- | 0 \}$

(18) $\bar{6}^+$ 0,0,z; 0,0,0
 $\{ \bar{6}_{001}^+ | 0 \}$

(19) m x, \bar{x} ,z
 $\{ m_{110} | 0 \}$

(20) m x,2x,z
 $\{ m_{100} | 0 \}$

(21) m 2x,x,z
 $\{ m_{010} | 0 \}$

(22) m x,x,z
 $\{ m_{1\bar{1}0} | 0 \}$

(23) m x,0,z
 $\{ m_{120} | 0 \}$

(24) m 0,y,z
 $\{ m_{210} | 0 \}$

Symmetry operations

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) 2 x,x,1/4
{ 2_{110} 0, 0, 1/2 } | (8) 2 x,0,1/4
{ 2_{100} 0, 0, 1/2 } | (9) 2 0,y,1/4
{ 2_{010} 0, 0, 1/2 } |
| (10) 2 x, \bar{x} , 1/4
{ $2_{1\bar{1}0}$ 0, 0, 1/2 } | (11) 2 x,2x,1/4
{ 2_{120} 0, 0, 1/2 } | (12) 2 2x,x,1/4
{ 2_{210} 0, 0, 1/2 } |
| (13) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (14) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (15) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (16) m x,y,0
{ m_{001} 0 } | (17) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (18) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |
| (19) c x, \bar{x} , z
{ m_{110} 0, 0, 1/2 } | (20) c x,2x,z
{ m_{100} 0, 0, 1/2 } | (21) c 2x,x,z
{ m_{010} 0, 0, 1/2 } |
| (22) c x,x,z
{ $m_{1\bar{1}0}$ 0, 0, 1/2 } | (23) c x,0,z
{ m_{120} 0, 0, 1/2 } | (24) c 0,y,z
{ m_{210} 0, 0, 1/2 } |

No. 75 (first setting)

$p6_3/m2/m2/c$

Symmetry operations

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |
| (7) 2 x,x,0
{ 2_{110} 0 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,0
{ 2_{010} 0 } |
| (10) 2 x, \bar{x} , 1/4
{ $2_{1\bar{1}0}$ 0, 0, 1/2 } | (11) 2 x, 2x, 1/4
{ 2_{120} 0, 0, 1/2 } | (12) 2 2x, x, 1/4
{ 2_{210} 0, 0, 1/2 } |
| (13) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (14) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (15) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (16) m x,y,1/4
{ m_{001} 0, 0, 1/2 } | (17) $\bar{6}^-$ 0,0,z; 0, 0, 1/4
{ $\bar{6}_{001}^-$ 0, 0, 1/2 } | (18) $\bar{6}^+$ 0,0,z; 0, 0, 1/4
{ $\bar{6}_{001}^+$ 0, 0, 1/2 } |
| (19) m x, \bar{x} , z
{ m_{110} 0 } | (20) m x, 2x, z
{ m_{100} 0 } | (21) m 2x, x, z
{ m_{010} 0 } |
| (22) c x,x,z
{ $m_{1\bar{1}0}$ 0, 0, 1/2 } | (23) c x,0,z
{ m_{120} 0, 0, 1/2 } | (24) c 0,y,z
{ m_{210} 0, 0, 1/2 } |

Symmetry operations

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 (0,0,1/2) 0,0,z
{ 2_{001} 0, 0, 1/2 } | (5) 6^- (0,0,1/2) 0,0,z
{ 6_{001}^- 0, 0, 1/2 } | (6) 6^+ (0,0,1/2) 0,0,z
{ 6_{001}^+ 0, 0, 1/2 } |
| (7) 2 x,x,1/4
{ 2_{110} 0, 0, 1/2 } | (8) 2 x,0,1/4
{ 2_{100} 0, 0, 1/2 } | (9) 2 0,y,1/4
{ 2_{010} 0, 0, 1/2 } |
| (10) 2 x, \bar{x} , 0
{ $2_{1\bar{1}0}$ 0 } | (11) 2 x,2x,0
{ 2_{120} 0 } | (12) 2 2x,x,0
{ 2_{210} 0 } |
| (13) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (14) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (15) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (16) m x,y,1/4
{ m_{001} 0, 0, 1/2 } | (17) $\bar{6}^-$ 0,0,z; 0, 0, 1/4
{ $\bar{6}_{001}^-$ 0, 0, 1/2 } | (18) $\bar{6}^+$ 0,0,z; 0, 0, 1/4
{ $\bar{6}_{001}^+$ 0, 0, 1/2 } |
| (19) c x, \bar{x} , z
{ m_{110} 0, 0, 1/2 } | (20) c x,2x,z
{ m_{100} 0, 0, 1/2 } | (21) c 2x,x,z
{ m_{010} 0, 0, 1/2 } |
| (22) m x,x,z
{ $m_{1\bar{1}0}$ 0 } | (23) m x,0,z
{ m_{120} 0 } | (24) m 0,y,z
{ m_{210} 0 } |

Seitz symbols for Layer Groups

No. 1
Symmetry operations

p1

$$(1) 1 \\ \{ 1 | 0 \}$$

No. 2
Symmetry operations

$p\bar{1}$

$$(1) 1 \quad (2) \bar{1} \quad 0,0,0 \\ \{ 1 | 0 \} \quad \{ \bar{1} | 0 \}$$

No. 3
Symmetry operations

p112

$$(1) 1 \quad (2) 2 \quad 0,0,z \\ \{ 1 | 0 \} \quad \{ 2_{001} | 0 \}$$

No. 4
Symmetry operations

p11m

$$(1) 1 \quad (2) m \quad x,y,0 \\ \{ 1 | 0 \} \quad \{ m_{001} | 0 \}$$

No. 5
Symmetry operations

p11a

$$(1) 1 \quad (2) a \quad x,y,0 \\ \{ 1 | 0 \} \quad \{ m_{001} | 1/2, 0, 0 \}$$

No. 6
Symmetry operations

p112/m

$$(1) 1 \quad (2) 2 \quad 0,0,z \quad (3) \bar{1} \quad 0,0,0 \quad (4) m \quad x,y,0 \\ \{ 1 | 0 \} \quad \{ 2_{001} | 0 \} \quad \{ \bar{1} | 0 \} \quad \{ m_{001} | 0 \}$$

No. 7
Symmetry operations

p112/a

$$(1) 1 \quad (2) 2 \quad 1/4,0,z \quad (3) \bar{1} \quad 0,0,0 \quad (4) a \quad x,y,0 \\ \{ 1 | 0 \} \quad \{ 2_{001} | 1/2, 0, 0 \} \quad \{ \bar{1} | 0 \} \quad \{ m_{001} | 1/2, 0, 0 \}$$

No. 8
Symmetry operations

p211

$$(1) 1 \quad (2) 2 \quad x,0,0 \\ \{ 1 | 0 \} \quad \{ 2_{100} | 0 \}$$

No. 9 p2₁11
Symmetry operations

$$(1) 1 \quad (2) 2 \quad (1/2, 0, 0) \quad x, 0, 0$$

$$\{ 1 | 0 \} \quad \{ 2_{100} | 1/2, 0, 0 \}$$

No. 10 c211
Symmetry operations

For (0,0,0) + set

$$(1) 1 \quad (2) 2 \quad x, 0, 0$$

$$\{ 1 | 0 \} \quad \{ 2_{100} | 0 \}$$

For (1/2, 1/2, 0) + set

$$(1) t \quad (1/2, 1/2, 0) \quad (2) 2 \quad (1/2, 0, 0) \quad x, 1/4, 0$$

$$\{ 1 | 1/2, 1/2, 0 \} \quad \{ 2_{100} | 1/2, 1/2, 0 \}$$

No. 11 pm11
Symmetry operations

$$(1) 1 \quad (2) m \quad 0, y, z$$

$$\{ 1 | 0 \} \quad \{ m_{100} | 0 \}$$

No. 12 pb11
Symmetry operations

$$(1) 1 \quad (2) b \quad 0, y, z$$

$$\{ 1 | 0 \} \quad \{ m_{100} | 0, 1/2, 0 \}$$

No. 13 cm11
Symmetry operations

For (0,0,0) + set

$$(1) 1 \quad (2) m \quad 0, y, z$$

$$\{ 1 | 0 \} \quad \{ m_{100} | 0 \}$$

For (1/2, 1/2, 0) + set

$$(1) t \quad (1/2, 1/2, 0) \quad (2) b \quad 1/4, y, z$$

$$\{ 1 | 1/2, 1/2, 0 \} \quad \{ m_{100} | 1/2, 1/2, 0 \}$$

No. 14 p2/m11
Symmetry operations

$$(1) 1 \quad (2) 2 \quad x, 0, 0 \quad (3) \bar{1} \quad 0, 0, 0 \quad (4) m \quad 0, y, z$$

$$\{ 1 | 0 \} \quad \{ 2_{100} | 0 \} \quad \{ \bar{1} | 0 \} \quad \{ m_{100} | 0 \}$$

No. 15 p2₁/m11
Symmetry operations

$$(1) 1 \quad (2) 2 \quad (1/2, 0, 0) \quad x, 0, 0 \quad (3) \bar{1} \quad 0, 0, 0 \quad (4) m \quad 1/4, y, z$$

$$\{ 1 | 0 \} \quad \{ 2_{100} | 1/2, 0, 0 \} \quad \{ \bar{1} | 0 \} \quad \{ m_{100} | 1/2, 0, 0 \}$$

No. 16

p2/b11

Symmetry operations

(1) 1
{ 1 | 0 }

(2) 2 x,1/4,0
{ 2₁₀₀ | 0, 1/2, 0 }

(3) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(4) b 0,y,z
{ m₁₀₀ | 0, 1/2, 0 }

No. 17

p2₁/b11**Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 2 (1/2,0,0) x,1/4,0
{ 2₁₀₀ | 1/2, 1/2, 0 }

(3) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(4) b 1/4,y,z
{ m₁₀₀ | 1/2, 1/2, 0 }

No. 18

c2/m11

Symmetry operations

For (0,0,0) + set

(1) 1
{ 1 | 0 }

(2) 2 x,0,0
{ 2₁₀₀ | 0 }

(3) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(4) m 0,y,z
{ m₁₀₀ | 0 }

For (1/2,1/2,0) + set

(1) t (1/2,1/2,0)
{ 1 | 1/2, 1/2, 0 }

(2) 2 (1/2,0,0) x,1/4,0
{ 2₁₀₀ | 1/2, 1/2, 0 }

(3) $\bar{1}$ 1/4,1/4,0
{ $\bar{1}$ | 1/2, 1/2, 0 }

(4) b 1/4,y,z
{ m₁₀₀ | 1/2, 1/2, 0 }

No. 19

p222

Symmetry operations

(1) 1
{ 1 | 0 }

(2) 2 0,0,z
{ 2₀₀₁ | 0 }

(3) 2 0,y,0
{ 2₀₁₀ | 0 }

(4) 2 x,0,0
{ 2₁₀₀ | 0 }

No. 20

p2₁22**Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 2 (1/2,0,0) x,0,0
{ 2₁₀₀ | 1/2, 0, 0 }

(3) 2 1/4,y,0
{ 2₀₁₀ | 1/2, 0, 0 }

(4) 2 0,0,z
{ 2₀₀₁ | 0 }

No. 21

p2₁2₁2**Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 2 0,0,z
{ 2₀₀₁ | 0 }

(3) 2 (0,1/2,0) 1/4,y,0
{ 2₀₁₀ | 1/2, 1/2, 0 }

(4) 2 (1/2,0,0) x,1/4,0
{ 2₁₀₀ | 1/2, 1/2, 0 }

No. 22

c222

Symmetry operations

For (0,0,0) + set

(1) 1
{ 1 | 0 }

(2) 2 0,0,z
{ 2₀₀₁ | 0 }

(3) 2 0,y,0
{ 2₀₁₀ | 0 }

(4) 2 x,0,0
{ 2₁₀₀ | 0 }

For (1/2,1/2,0) + set

(1) t (1/2,1/2,0)
{ 1 | 1/2, 1/2, 0 }

(2) 2 1/4,1/4,z
{ 2₀₀₁ | 1/2, 1/2, 0 }

(3) 2 (0,1/2,0) 1/4,y,0
{ 2₀₁₀ | 1/2, 1/2, 0 }

(4) 2 (1/2,0,0) x,1/4,0
{ 2₁₀₀ | 1/2, 1/2, 0 }

No. 23

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,0,z
 $\{ 2_{001} | 0 \}$

pmm2

(3) m x,0,z
 $\{ m_{010} | 0 \}$

(4) m 0,y,z
 $\{ m_{100} | 0 \}$

No. 24

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,0,z
 $\{ 2_{001} | 0 \}$

pma2

(3) a x,0,z
 $\{ m_{010} | 1/2, 0, 0 \}$

(4) m 1/4,y,z
 $\{ m_{100} | 1/2, 0, 0 \}$

No. 25

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,0,z
 $\{ 2_{001} | 0 \}$

pba2

(3) a x,1/4,z
 $\{ m_{010} | 1/2, 1/2, 0 \}$

(4) b 1/4,y,z
 $\{ m_{100} | 1/2, 1/2, 0 \}$

No. 26

Symmetry operations

For (0,0,0) + set
 (1) 1
 $\{ 1 | 0 \}$

(2) 2 0,0,z
 $\{ 2_{001} | 0 \}$

cmm2

(3) m x,0,z
 $\{ m_{010} | 0 \}$

(4) m 0,y,z
 $\{ m_{100} | 0 \}$

For (1/2,1/2,0) + set
 (1) t (1/2,1/2,0)
 $\{ 1 | 1/2, 1/2, 0 \}$

(2) 2 1/4,1/4,z
 $\{ 2_{001} | 1/2, 1/2, 0 \}$

(3) a x,1/4,z
 $\{ m_{010} | 1/2, 1/2, 0 \}$

(4) b 1/4,y,z
 $\{ m_{100} | 1/2, 1/2, 0 \}$

No. 27

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,y,0
 $\{ 2_{010} | 0 \}$

pm2m

(3) m 0,y,z
 $\{ m_{100} | 0 \}$

(4) m x,y,0
 $\{ m_{001} | 0 \}$

No. 28

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 (0,1/2,0) 0,y,0
 $\{ 2_{010} | 0, 1/2, 0 \}$

pm2₁b

(3) b x,y,0
 $\{ m_{001} | 0, 1/2, 0 \}$

(4) m 0,y,z
 $\{ m_{100} | 0 \}$

No. 29

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 (0,1/2,0) 0,y,0
 $\{ 2_{010} | 0, 1/2, 0 \}$

pb2₁m

(3) b 0,y,z
 $\{ m_{100} | 0, 1/2, 0 \}$

(4) m x,y,0
 $\{ m_{001} | 0 \}$

No. 30

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,y,0
 $\{ 2_{010} | 0 \}$

pb2b

(3) b x,y,0
 $\{ m_{001} | 0, 1/2, 0 \}$

(4) b 0,y,z
 $\{ m_{100} | 0, 1/2, 0 \}$

No. 31

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,y,0
 $\{ 2_{010} | 0 \}$

pm2a

(3) a x,y,0
 $\{ m_{001} | 1/2, 0, 0 \}$

(4) m 1/4,y,z
 $\{ m_{100} | 1/2, 0, 0 \}$

No. 32

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 (0,1/2,0) 1/4,y,0
 $\{ 2_{010} | 1/2, 1/2, 0 \}$

pm2₁n

(3) n (1/2,1/2,0) x,y,0
 $\{ m_{001} | 1/2, 1/2, 0 \}$

(4) m 0,y,z
 $\{ m_{100} | 0 \}$

No. 33

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 (0,1/2,0) 0,y,0
 $\{ 2_{010} | 0, 1/2, 0 \}$

pb2₁a

(3) a x,y,0
 $\{ m_{001} | 1/2, 0, 0 \}$

(4) b 1/4,y,z
 $\{ m_{100} | 1/2, 1/2, 0 \}$

No. 34

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,y,0
 $\{ 2_{010} | 0 \}$

pb2n

(3) b 1/4,y,z
 $\{ m_{100} | 1/2, 1/2, 0 \}$

(4) n (1/2,1/2,0) x,y,0
 $\{ m_{001} | 1/2, 1/2, 0 \}$

No. 35

Symmetry operations

For (0,0,0) + set

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,y,0
 $\{ 2_{010} | 0 \}$

cm2m

(3) m 0,y,z
 $\{ m_{100} | 0 \}$

(4) m x,y,0
 $\{ m_{001} | 0 \}$

For (1/2,1/2,0) + set

(1) t (1/2,1/2,0)
 $\{ 1 | 1/2, 1/2, 0 \}$

(2) 2 (0,1/2,0) 1/4,y,0
 $\{ 2_{010} | 1/2, 1/2, 0 \}$

(3) b 1/4,y,z
 $\{ m_{100} | 1/2, 1/2, 0 \}$

(4) n (1/2,1/2,0) x,y,0
 $\{ m_{001} | 1/2, 1/2, 0 \}$

No. 36

Symmetry operations

For (0,0,0) + set

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,y,0
 $\{ 2_{010} | 0 \}$

cm2a

(3) m 1/4,y,z
 $\{ m_{100} | 1/2, 0, 0 \}$

(4) a x,y,0
 $\{ m_{001} | 1/2, 0, 0 \}$

For (1/2,1/2,0) + set

(1) t (1/2,1/2,0)
 $\{ 1 | 1/2, 1/2, 0 \}$

(2) 2 (0,1/2,0) 1/4,y,0
 $\{ 2_{010} | 1/2, 1/2, 0 \}$

(3) b 0,y,z
 $\{ m_{100} | 0, 1/2, 0 \}$

(4) b x,y,0
 $\{ m_{001} | 0, 1/2, 0 \}$

No. 37

Symmetry operations

(1) 1
 $\{ 1 | 0 \}$

(2) 2 0,0,z
 $\{ 2_{001} | 0 \}$

p2/m2/m2/m

(3) 2 0,y,0
 $\{ 2_{010} | 0 \}$

(4) 2 x,0,0
 $\{ 2_{100} | 0 \}$

(5) $\bar{1}$ 0,0,0
 $\{ \bar{1} | 0 \}$

(6) m x,y,0
 $\{ m_{001} | 0 \}$

(7) m x,0,z
 $\{ m_{010} | 0 \}$

(8) m 0,y,z
 $\{ m_{100} | 0 \}$

No. 38

Symmetry operations

p2/m2/a2/a

(1) 1
{ 1 | 0 }

(2) 2 x,0,0
{ 2₁₀₀ | 0 }

(3) 2 1/4,0,z
{ 2₀₀₁ | 1/2, 0, 0 }

(4) 2 1/4,y,0
{ 2₀₁₀ | 1/2, 0, 0 }

(5) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(6) m 0,y,z
{ m₁₀₀ | 0 }

(7) a x,y,0
{ m₀₀₁ | 1/2, 0, 0 }

(8) a x,0,z
{ m₀₁₀ | 1/2, 0, 0 }

No. 39

Symmetry operations

p2/b2/a2/n

(1) 1
{ 1 | 0 }

(2) 2 1/4,1/4,z
{ 2₀₀₁ | 1/2, 1/2, 0 }

(3) 2 1/4,y,0
{ 2₀₁₀ | 1/2, 0, 0 }

(4) 2 x,1/4,0
{ 2₁₀₀ | 0, 1/2, 0 }

(5) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(6) n (1/2,1/2,0) x,y,0
{ m₀₀₁ | 1/2, 1/2, 0 }

(7) a x,0,z
{ m₀₁₀ | 1/2, 0, 0 }

(8) b 0,y,z
{ m₁₀₀ | 0, 1/2, 0 }

No. 40

Symmetry operationsp2₁/m2/a2/m

(1) 1
{ 1 | 0 }

(2) 2 1/4,y,0
{ 2₀₁₀ | 1/2, 0, 0 }

(3) 2 0,0,z
{ 2₀₀₁ | 0 }

(4) 2 (1/2,0,0) x,0,0
{ 2₁₀₀ | 1/2, 0, 0 }

(5) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(6) a x,0,z
{ m₀₁₀ | 1/2, 0, 0 }

(7) m x,y,0
{ m₀₀₁ | 0 }

(8) m 1/4,y,z
{ m₁₀₀ | 1/2, 0, 0 }

No. 41

Symmetry operationsp2₁/m2/m2/a

(1) 1
{ 1 | 0 }

(2) 2 1/4,0,z
{ 2₀₀₁ | 1/2, 0, 0 }

(3) 2 0,y,0
{ 2₀₁₀ | 0 }

(4) 2 (1/2,0,0) x,0,0
{ 2₁₀₀ | 1/2, 0, 0 }

(5) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(6) a x,y,0
{ m₀₀₁ | 1/2, 0, 0 }

(7) m x,0,z
{ m₀₁₀ | 0 }

(8) m 1/4,y,z
{ m₁₀₀ | 1/2, 0, 0 }

No. 42

Symmetry operationsp2/m2₁/a2/n

(1) 1
{ 1 | 0 }

(2) 2 (0,1/2,0) 1/4,y,0
{ 2₀₁₀ | 1/2, 1/2, 0 }

(3) 2 1/4,1/4,z
{ 2₀₀₁ | 1/2, 1/2, 0 }

(4) 2 x,0,0
{ 2₁₀₀ | 0 }

(5) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(6) a x,1/4,z
{ m₀₁₀ | 1/2, 1/2, 0 }

(7) n (1/2,1/2,0) x,y,0
{ m₀₀₁ | 1/2, 1/2, 0 }

(8) m 0,y,z
{ m₁₀₀ | 0 }

No. 43

Symmetry operationsp2/b2₁/a2/a

(1) 1
{ 1 | 0 }

(2) 2 x,1/4,0
{ 2₁₀₀ | 0, 1/2, 0 }

(3) 2 1/4,0,z
{ 2₀₀₁ | 1/2, 0, 0 }

(4) 2 (0,1/2,0) 1/4,y,0
{ 2₀₁₀ | 1/2, 1/2, 0 }

(5) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(6) b 0,y,z
{ m₁₀₀ | 0, 1/2, 0 }

(7) a x,y,0
{ m₀₀₁ | 1/2, 0, 0 }

(8) a x,1/4,z
{ m₀₁₀ | 1/2, 1/2, 0 }

No. 44

 $p2_1/b2_1/a2/m$ **Symmetry operations**

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 2 (0,1/2,0) 1/4,y,0
{ 2 ₀₁₀ 1/2, 1/2, 0 } | (4) 2 (1/2,0,0) x,1/4,0
{ 2 ₁₀₀ 1/2, 1/2, 0 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) m x,y,0
{ m ₀₀₁ 0 } | (7) a x,1/4,z
{ m ₀₁₀ 1/2, 1/2, 0 } | (8) b 1/4,y,z
{ m ₁₀₀ 1/2, 1/2, 0 } |

No. 45

 $p2_1/b2_1/m2/a$ **Symmetry operations**

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 (0,1/2,0) 0,y,0
{ 2 ₀₁₀ 0, 1/2, 0 } | (3) 2 (1/2,0,0) x,1/4,0
{ 2 ₁₀₀ 1/2, 1/2, 0 } | (4) 2 1/4,0,z
{ 2 ₀₀₁ 1/2, 0, 0 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) m x,1/4,z
{ m ₀₁₀ 0, 1/2, 0 } | (7) b 1/4,y,z
{ m ₁₀₀ 1/2, 1/2, 0 } | (8) a x,y,0
{ m ₀₀₁ 1/2, 0, 0 } |

No. 46

 $p2_1/m2_1/m2/n$ **Symmetry operations**

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 1/4,1/4,z
{ 2 ₀₀₁ 1/2, 1/2, 0 } | (3) 2 (0,1/2,0) 0,y,0
{ 2 ₀₁₀ 0, 1/2, 0 } | (4) 2 (1/2,0,0) x,0,0
{ 2 ₁₀₀ 1/2, 0, 0 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) n (1/2,1/2,0) x,y,0
{ m ₀₀₁ 1/2, 1/2, 0 } | (7) m x,1/4,z
{ m ₀₁₀ 0, 1/2, 0 } | (8) m 1/4,y,z
{ m ₁₀₀ 1/2, 0, 0 } |

No. 47

 $c2/m2/m2/m$ **Symmetry operations**

For (0,0,0) + set

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 2 0,y,0
{ 2 ₀₁₀ 0 } | (4) 2 x,0,0
{ 2 ₁₀₀ 0 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) m x,y,0
{ m ₀₀₁ 0 } | (7) m x,0,z
{ m ₀₁₀ 0 } | (8) m 0,y,z
{ m ₁₀₀ 0 } |

For (1/2,1/2,0) + set

- | | | | |
|--|---|---|---|
| (1) t (1/2,1/2,0)
{ 1 1/2, 1/2, 0 } | (2) 2 1/4,1/4,z
{ 2 ₀₀₁ 1/2, 1/2, 0 } | (3) 2 (0,1/2,0) 1/4,y,0
{ 2 ₀₁₀ 1/2, 1/2, 0 } | (4) 2 (1/2,0,0) x,1/4,0
{ 2 ₁₀₀ 1/2, 1/2, 0 } |
| (5) $\bar{1}$ 1/4,1/4,0
{ $\bar{1}$ 1/2, 1/2, 0 } | (6) n (1/2,1/2,0) x,y,0
{ m ₀₀₁ 1/2, 1/2, 0 } | (7) a x,1/4,z
{ m ₀₁₀ 1/2, 1/2, 0 } | (8) b 1/4,y,z
{ m ₁₀₀ 1/2, 1/2, 0 } |

No. 48

 $c2/m2/m2/e$ **Symmetry operations**

For (0,0,0) + set

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,1/4,z
{ 2 ₀₀₁ 0, 1/2, 0 } | (3) 2 (0,1/2,0) 0,y,0
{ 2 ₀₁₀ 0, 1/2, 0 } | (4) 2 x,0,0
{ 2 ₁₀₀ 0 } |
| (5) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (6) b x,y,0
{ m ₀₀₁ 0, 1/2, 0 } | (7) m x,1/4,z
{ m ₀₁₀ 0, 1/2, 0 } | (8) m 0,y,z
{ m ₁₀₀ 0 } |

For (1/2, 1/2, 0) + set

(1) $t \begin{pmatrix} 1/2, 1/2, 0 \\ \{ 1 | 1/2, 1/2, 0 \} \end{pmatrix}$

(2) $2 \begin{pmatrix} 1/4, 0, z \\ \{ 2_{001} | 1/2, 0, 0 \} \end{pmatrix}$

(3) $2 \begin{pmatrix} 1/4, y, 0 \\ \{ 2_{010} | 1/2, 0, 0 \} \end{pmatrix}$

(4) $2 \begin{pmatrix} 1/2, 0, 0 \\ \{ 2_{100} | 1/2, 1/2, 0 \} \end{pmatrix} \quad x, 1/4, 0$

(5) $\bar{1} \begin{pmatrix} 1/4, 1/4, 0 \\ \{ \bar{1} | 1/2, 1/2, 0 \} \end{pmatrix}$

(6) $a \begin{pmatrix} x, y, 0 \\ \{ m_{001} | 1/2, 0, 0 \} \end{pmatrix}$

(7) $a \begin{pmatrix} x, 0, z \\ \{ m_{010} | 1/2, 0, 0 \} \end{pmatrix}$

(8) $b \begin{pmatrix} 1/4, y, z \\ \{ m_{100} | 1/2, 1/2, 0 \} \end{pmatrix}$

No. 49

Symmetry operations

p4

(1) 1
 $\{ 1 | 0 \}$

(2) $2 \begin{pmatrix} 0, 0, z \\ \{ 2_{001} | 0 \} \end{pmatrix}$

(3) $4^+ \begin{pmatrix} 0, 0, z \\ \{ 4_{001}^+ | 0 \} \end{pmatrix}$

(4) $4^- \begin{pmatrix} 0, 0, z \\ \{ 4_{001}^- | 0 \} \end{pmatrix}$

No. 50

Symmetry operations

$p\bar{4}$

(1) 1
 $\{ 1 | 0 \}$

(2) $2 \begin{pmatrix} 0, 0, z \\ \{ 2_{001} | 0 \} \end{pmatrix}$

(3) $\bar{4}^+ \begin{pmatrix} 0, 0, z; 0, 0, 0 \\ \{ \bar{4}_{001}^+ | 0 \} \end{pmatrix}$

(4) $\bar{4}^- \begin{pmatrix} 0, 0, z; 0, 0, 0 \\ \{ \bar{4}_{001}^- | 0 \} \end{pmatrix}$

No. 51

Symmetry operations

p4/m

(1) 1
 $\{ 1 | 0 \}$

(2) $2 \begin{pmatrix} 0, 0, z \\ \{ 2_{001} | 0 \} \end{pmatrix}$

(3) $4^+ \begin{pmatrix} 0, 0, z \\ \{ 4_{001}^+ | 0 \} \end{pmatrix}$

(4) $4^- \begin{pmatrix} 0, 0, z \\ \{ 4_{001}^- | 0 \} \end{pmatrix}$

(5) $\bar{1} \begin{pmatrix} 0, 0, 0 \\ \{ \bar{1} | 0 \} \end{pmatrix}$

(6) $m \begin{pmatrix} x, y, 0 \\ \{ m_{001} | 0 \} \end{pmatrix}$

(7) $\bar{4}^+ \begin{pmatrix} 0, 0, z; 0, 0, 0 \\ \{ \bar{4}_{001}^+ | 0 \} \end{pmatrix}$

(8) $\bar{4}^- \begin{pmatrix} 0, 0, z; 0, 0, 0 \\ \{ \bar{4}_{001}^- | 0 \} \end{pmatrix}$

No. 52 (Origin Choice 1)

Symmetry operations

p4/n

(1) 1
 $\{ 1 | 0 \}$

(2) $2 \begin{pmatrix} 0, 0, z \\ \{ 2_{001} | 0 \} \end{pmatrix}$

(3) $4^+ \begin{pmatrix} 0, 0, z \\ \{ 4_{001}^+ | 0 \} \end{pmatrix}$

(4) $4^- \begin{pmatrix} 0, 0, z \\ \{ 4_{001}^- | 0 \} \end{pmatrix}$

(5) $\bar{1} \begin{pmatrix} 1/4, 1/4, 0 \\ \{ \bar{1} | 1/2, 1/2, 0 \} \end{pmatrix}$

(6) $n \begin{pmatrix} 1/2, 1/2, 0 \\ \{ m_{001} | 1/2, 1/2, 0 \} \end{pmatrix} \quad x, y, 0$

(7) $\bar{4}^+ \begin{pmatrix} 1/2, 0, z; 1/2, 0, 0 \\ \{ \bar{4}_{001}^+ | 1/2, 1/2, 0 \} \end{pmatrix}$

(8) $\bar{4}^- \begin{pmatrix} 0, 1/2, z; 0, 1/2, 0 \\ \{ \bar{4}_{001}^- | 1/2, 1/2, 0 \} \end{pmatrix}$

No. 52 (Origin Choice 2)

Symmetry operations

p4/n

(1) 1
 $\{ 1 | 0 \}$

(2) $2 \begin{pmatrix} 1/4, 1/4, z \\ \{ 2_{001} | 1/2, 1/2, 0 \} \end{pmatrix}$

(3) $4^+ \begin{pmatrix} 1/4, 1/4, z \\ \{ 4_{001}^+ | 1/2, 0, 0 \} \end{pmatrix}$

(4) $4^- \begin{pmatrix} 1/4, 1/4, z \\ \{ 4_{001}^- | 0, 1/2, 0 \} \end{pmatrix}$

(5) $\bar{1} \begin{pmatrix} 0, 0, 0 \\ \{ \bar{1} | 0 \} \end{pmatrix}$

(6) $n \begin{pmatrix} 1/2, 1/2, 0 \\ \{ m_{001} | 1/2, 1/2, 0 \} \end{pmatrix} \quad x, y, 0$

(7) $\bar{4}^+ \begin{pmatrix} 1/4, -1/4, z; 1/4, -1/4, 0 \\ \{ \bar{4}_{001}^+ | 1/2, 0, 0 \} \end{pmatrix}$

(8) $\bar{4}^- \begin{pmatrix} -1/4, 1/4, z; -1/4, 1/4, 0 \\ \{ \bar{4}_{001}^- | 0, 1/2, 0 \} \end{pmatrix}$

No. 53

p422

Symmetry operations

- | | | | |
|------------------------------------|------------------------------------|---|---|
| (1) 1
$\{ 1 0 \}$ | (2) 2 0,0,z
$\{ 2_{001} 0 \}$ | (3) 4 ⁺ 0,0,z
$\{ 4_{001}^+ 0 \}$ | (4) 4 ⁻ 0,0,z
$\{ 4_{001}^- 0 \}$ |
| (5) 2 0,y,0
$\{ 2_{010} 0 \}$ | (6) 2 x,0,0
$\{ 2_{100} 0 \}$ | (7) 2 x,x,0
$\{ 2_{110} 0 \}$ | (8) 2 x, \bar{x} , 0
$\{ 2_{1\bar{1}0} 0 \}$ |

No. 54

p42₁2**Symmetry operations**

- | | | | |
|--|--|--|---|
| (1) 1
$\{ 1 0 \}$ | (2) 2 0,0,z
$\{ 2_{001} 0 \}$ | (3) 4 ⁺ 0,0,z
$\{ 4_{001}^+ 0 \}$ | (4) 4 ⁻ 0,0,z
$\{ 4_{001}^- 0 \}$ |
| (5) 2 (0,1/2,0) 1/4,y,0
$\{ 2_{010} 1/2, 1/2, 0 \}$ | (6) 2 (1/2,0,0) x,1/4,0
$\{ 2_{100} 1/2, 1/2, 0 \}$ | (7) 2 (1/2,1/2,0) x,x,0
$\{ 2_{110} 1/2, 1/2, 0 \}$ | (8) 2 x, \bar{x} +1/2, 0
$\{ 2_{1\bar{1}0} 1/2, 1/2, 0 \}$ |

No. 55

p4mm

Symmetry operations

- | | | | |
|------------------------------------|------------------------------------|---|---|
| (1) 1
$\{ 1 0 \}$ | (2) 2 0,0,z
$\{ 2_{001} 0 \}$ | (3) 4 ⁺ 0,0,z
$\{ 4_{001}^+ 0 \}$ | (4) 4 ⁻ 0,0,z
$\{ 4_{001}^- 0 \}$ |
| (5) m x,0,z
$\{ m_{010} 0 \}$ | (6) m 0,y,z
$\{ m_{100} 0 \}$ | (7) m x, \bar{x} , z
$\{ m_{110} 0 \}$ | (8) m x,x,z
$\{ m_{1\bar{1}0} 0 \}$ |

No. 56

p4bm

Symmetry operations

- | | | | |
|--|--|---|--|
| (1) 1
$\{ 1 0 \}$ | (2) 2 0,0,z
$\{ 2_{001} 0 \}$ | (3) 4 ⁺ 0,0,z
$\{ 4_{001}^+ 0 \}$ | (4) 4 ⁻ 0,0,z
$\{ 4_{001}^- 0 \}$ |
| (5) a x,1/4,z
$\{ m_{010} 1/2, 1/2, 0 \}$ | (6) b 1/4,y,z
$\{ m_{100} 1/2, 1/2, 0 \}$ | (7) m x+1/2, \bar{x} , z
$\{ m_{110} 1/2, 1/2, 0 \}$ | (8) g (1/2,1/2,0) x,x,z
$\{ m_{1\bar{1}0} 1/2, 1/2, 0 \}$ |

No. 57

p $\bar{4}$ 2m**Symmetry operations**

- | | | | |
|------------------------------------|------------------------------------|---|---|
| (1) 1
$\{ 1 0 \}$ | (2) 2 0,0,z
$\{ 2_{001} 0 \}$ | (3) $\bar{4}^+$ 0,0,z; 0,0,0
$\{ \bar{4}_{001}^+ 0 \}$ | (4) $\bar{4}^-$ 0,0,z; 0,0,0
$\{ \bar{4}_{001}^- 0 \}$ |
| (5) 2 0,y,0
$\{ 2_{010} 0 \}$ | (6) 2 x,0,0
$\{ 2_{100} 0 \}$ | (7) m x, \bar{x} , z
$\{ m_{110} 0 \}$ | (8) m x,x,z
$\{ m_{1\bar{1}0} 0 \}$ |

No. 58

Symmetry operations

- (1) 1 { 1 | 0 }
 (2) 2 0,0,z { 2₀₀₁ | 0 }
 (5) 2 (0,1/2,0) 1/4,y,0 { 2₀₁₀ | 1/2, 1/2, 0 }
 (6) 2 (1/2,0,0) x,1/4,0 { 2₁₀₀ | 1/2, 1/2, 0 }

$p\bar{4}2_1m$

- (3) $\bar{4}^+$ 0,0,z; 0,0,0 { $\bar{4}^+_{001}$ | 0 }
 (4) $\bar{4}^-$ 0,0,z; 0,0,0 { $\bar{4}^-_{001}$ | 0 }
 (7) m x+1/2, \bar{x} ,z { m₁₁₀ | 1/2, 1/2, 0 }
 (8) g (1/2,1/2,0) x,x,0 { m_{1 $\bar{1}0$} | 1/2, 1/2, 0 }

No. 59

Symmetry operations

- (1) 1 { 1 | 0 }
 (2) 2 0,0,z { 2₀₀₁ | 0 }
 (5) m x,0,z { m₀₁₀ | 0 }
 (6) m 0,y,z { m₁₀₀ | 0 }

$p\bar{4}m2$

- (3) $\bar{4}^+$ 0,0,z; 0,0,0 { $\bar{4}^+_{001}$ | 0 }
 (4) $\bar{4}^-$ 0,0,z; 0,0,0 { $\bar{4}^-_{001}$ | 0 }
 (7) 2 x,x,0 { 2₁₁₀ | 0 }
 (8) 2 x, \bar{x} ,0 { 2_{1 $\bar{1}0$} | 0 }

No. 60

Symmetry operations

- (1) 1 { 1 | 0 }
 (2) 2 0,0,z { 2₀₀₁ | 0 }
 (5) a x,1/4,z { m₀₁₀ | 1/2, 1/2, 0 }
 (6) b 1/4,y,z { m₁₀₀ | 1/2, 1/2, 0 }

$p\bar{4}b2$

- (3) $\bar{4}^+$ 0,0,z; 0,0,0 { $\bar{4}^+_{001}$ | 0 }
 (4) $\bar{4}^-$ 0,0,z; 0,0,0 { $\bar{4}^-_{001}$ | 0 }
 (7) 2 (1/2,1/2,0) x,x,0 { 2₁₁₀ | 1/2, 1/2, 0 }
 (8) 2 x, \bar{x} +1/2,0 { 2_{1 $\bar{1}0$} | 1/2, 1/2, 0 }

No. 61

Symmetry operations

- (1) 1 { 1 | 0 }
 (2) 2 0,0,z { 2₀₀₁ | 0 }
 (5) 2 0,y,0 { 2₀₁₀ | 0 }
 (6) 2 x,0,0 { 2₁₀₀ | 0 }
 (9) $\bar{1}$ 0,0,0 { $\bar{1}$ | 0 }
 (10) m x,y,0 { m₀₀₁ | 0 }
 (13) m x,0,z { m₀₁₀ | 0 }
 (14) m 0,y,z { m₁₀₀ | 0 }

$p4/m2/m2/m$

- (3) 4^+ 0,0,z { 4^+_{001} | 0 }
 (4) 4^- 0,0,z { 4^-_{001} | 0 }
 (7) 2 x,x,0 { 2₁₁₀ | 0 }
 (8) 2 x, \bar{x} ,0 { 2_{1 $\bar{1}0$} | 0 }
 (11) $\bar{4}^+$ 0,0,z; 0,0,0 { $\bar{4}^+_{001}$ | 0 }
 (12) $\bar{4}^-$ 0,0,z; 0,0,0 { $\bar{4}^-_{001}$ | 0 }
 (15) m x, \bar{x} ,z { m₁₁₀ | 0 }
 (16) m x,x,z { m_{1 $\bar{1}0$} | 0 }

No. 62 (origin choice 1)
Symmetry operations

p4/n2/b2/m

- | | | | |
|--|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) 2 0,y,0
{ 2 ₀₁₀ 0 } | (6) 2 x,0,0
{ 2 ₁₀₀ 0 } | (7) 2 x,x,0
{ 2 ₁₁₀ 0 } | (8) 2 x, \bar{x} , 0
{ 2 _{1$\bar{1}$0} 0 } |
| (9) $\bar{1}$ 1/4,1/4,0
{ $\bar{1}$ 1/2, 1/2, 0 } | (10) n(1/2,1/2,0) x,y,0
{ m ₀₀₁ 1/2, 1/2, 0 } | (11) $\bar{4}^+$ 1/2,0,z; 1/2,0,0
{ $\bar{4}^+$ ₀₀₁ 1/2, 1/2, 0 } | (12) $\bar{4}^-$ 0,1/2,z; 0,1/2,0
{ $\bar{4}^-$ ₀₀₁ 1/2, 1/2, 0 } |
| (13) a x,1/4,z
{ m ₀₁₀ 1/2, 1/2, 0 } | (14) b 1/4,y,z
{ m ₁₀₀ 1/2, 1/2, 0 } | (15) m x+1/2, \bar{x} , z
{ m ₁₁₀ 1/2, 1/2, 0 } | (16) g(1/2,1/2,0) x,x,z
{ m _{1$\bar{1}$0} 1/2, 1/2, 0 } |

No. 62 (origin choice 2)
Symmetry operations

p4/n2/b2/m

- | | | | |
|---|---|---|---|
| (1) 1
{ 1 0 } | (2) 2 1/4,1/4,z
{ 2 ₀₀₁ 1/2, 1/2, 0 } | (3) 4 ⁺ 1/4,1/4,z
{ 4 ₀₀₁ ⁺ 1/2, 0, 0 } | (4) 4 ⁻ 1/4,1/4,z
{ 4 ₀₀₁ ⁻ 0, 1/2, 0 } |
| (5) 2 1/4,y,0
{ 2 ₀₁₀ 1/2, 0, 0 } | (6) 2 x,1/4,0
{ 2 ₁₀₀ 0, 1/2, 0 } | (7) 2 x,x,0
{ 2 ₁₁₀ 0 } | (8) 2 x, \bar{x} +1/2,0
{ 2 _{1$\bar{1}$0} 1/2, 1/2, 0 } |
| (9) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (10) n(1/2,1/2,0) x,y,0
{ m ₀₀₁ 1/2, 1/2, 0 } | (11) $\bar{4}^+$ 1/4,-1/4,z; 1/4,-1/4,0
{ $\bar{4}^+$ ₀₀₁ 1/2, 0, 0 } | (12) $\bar{4}^-$ -1/4,1/4,z; -1/4,1/4,0
{ $\bar{4}^-$ ₀₀₁ 0, 1/2, 0 } |
| (13) a x,0,z
{ m ₀₁₀ 1/2, 0, 0 } | (14) b 0,y,z
{ m ₁₀₀ 0, 1/2, 0 } | (15) m x, \bar{x} , z
{ m ₁₁₀ 0 } | (16) g(1/2,1/2,0) x,x,z
{ m _{1$\bar{1}$0} 1/2, 1/2, 0 } |

No. 63
Symmetry operations

p4/m2₁/b2/m

- | | | | |
|---|---|---|--|
| (1) 1
{ 1 0 } | (2) 2 0,0,z
{ 2 ₀₀₁ 0 } | (3) 4 ⁺ 0,0,z
{ 4 ₀₀₁ ⁺ 0 } | (4) 4 ⁻ 0,0,z
{ 4 ₀₀₁ ⁻ 0 } |
| (5) 2 (0,1/2,0) 1/4,y,0
{ 2 ₀₁₀ 1/2, 1/2, 0 } | (6) 2 (1/2,0,0) x,1/4,0
{ 2 ₁₀₀ 1/2, 1/2, 0 } | (7) 2 (1/2,1/2,0) x,x,0
{ 2 ₁₁₀ 1/2, 1/2, 0 } | (8) 2 x, \bar{x} +1/2,0
{ 2 _{1$\bar{1}$0} 1/2, 1/2, 0 } |
| (9) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (10) m x,y,0
{ m ₀₀₁ 0 } | (11) $\bar{4}^+$ 0,0,z; 0,0,0
{ $\bar{4}^+$ ₀₀₁ 0 } | (12) $\bar{4}^-$ 0,0,z; 0,0,0
{ $\bar{4}^-$ ₀₀₁ 0 } |
| (13) a x,1/4,z
{ m ₀₁₀ 1/2, 1/2, 0 } | (14) b 1/4,y,z
{ m ₁₀₀ 1/2, 1/2, 0 } | (15) m x+1/2, \bar{x} , z
{ m ₁₁₀ 1/2, 1/2, 0 } | (16) g (1/2,1/2,0) x,x,z
{ m _{1$\bar{1}$0} 1/2, 1/2, 0 } |

No. 64 (origin choice 1)

Symmetry operations

(1) 1
{ 1 | 0 }

(2) 2 0,0,z
{ 2₀₀₁ | 0 }

p4/n2₁/m2/m

(3) 4⁺ 0,0,z
{ 4⁺₀₀₁ | 0 }

(4) 4⁻ 0,0,z
{ 4⁻₀₀₁ | 0 }

(5) 2 (0,1/2,0) 1/4,y,0
{ 2₀₁₀ | 1/2, 1/2, 0 }

(6) 2 (1/2,0,0) x,1/4,0
{ 2₁₀₀ | 1/2, 1/2, 0 }

(7) 2 (1/2,1/2,0) x,x,0
{ 2₁₁₀ | 1/2, 1/2, 0 }

(8) 2 x, x̄+1/2, 0
{ 2_{1̄10} | 1/2, 1/2, 0 }

(9) 1̄ 1/4,1/4,0
{ 1̄ | 1/2, 1/2, 0 }

(10) n (1/2,1/2,0) x,y,0
{ m₀₀₁ | 1/2, 1/2, 0 }

(11) 4⁺ 1/2,0,z; 1/2,0,0
{ 4⁺₀₀₁ | 1/2, 1/2, 0 }

(12) 4⁻ 0,1/2,z; 0,1/2,0
{ 4⁻₀₀₁ | 1/2, 1/2, 0 }

(13) m x,0,z
{ m₀₁₀ | 0 }

(14) m 0,y,z
{ m₁₀₀ | 0 }

(15) m x, x̄,z
{ m₁₁₀ | 0 }

(16) m x,x,z
{ m_{1̄10} | 0 }

No. 64 (origin choice 2)

Symmetry operations

(1) 1
{ 1 | 0 }

(2) 2 1/4,1/4,z
{ 2₀₀₁ | 1/2, 1/2, 0 }

p4/n2₁/m2/m

(3) 4⁺ 1/4,1/4,z
{ 4⁺₀₀₁ | 1/2, 0, 0 }

(4) 4⁻ 1/4,1/4,z
{ 4⁻₀₀₁ | 0, 1/2, 0 }

(5) 2 (0,1/2,0) 0,y,0
{ 2₀₁₀ | 0, 1/2, 0 }

(6) 2 (1/2,0,0) x,0,0
{ 2₁₀₀ | 1/2, 0, 0 }

(7) 2 (1/2,1/2,0) x,x,0
{ 2₁₁₀ | 1/2, 1/2, 0 }

(8) 2 x, x̄, 0
{ 2_{1̄10} | 0 }

(9) 1̄ 0,0,0
{ 1̄ | 0 }

(10) n (1/2,1/2,0) x,y,0
{ m₀₀₁ | 1/2, 1/2, 0 }

(11) 4⁺ 1/4,-1/4,z; 1/4,-1/4,0
{ 4⁺₀₀₁ | 1/2, 0, 0 }

(12) 4⁻ -1/4,1/4,z; -1/4,1/4,0
{ 4⁻₀₀₁ | 0, 1/2, 0 }

(13) m x,1/4,z
{ m₀₁₀ | 0, 1/2, 0 }

(14) m 1/4,y,z
{ m₁₀₀ | 1/2, 0, 0 }

(15) m x+1/2, x̄,z
{ m₁₁₀ | 1/2, 1/2, 0 }

(16) m x,x,z
{ m_{1̄10} | 0 }

No. 65

Symmetry operations

p3

(1) 1
{ 1 | 0 }

(2) 3⁺ 0,0,z
{ 3⁺₀₀₁ | 0 }

(3) 3⁻ 0,0,z
{ 3⁻₀₀₁ | 0 }

No. 66

Symmetry operations

p3̄

(1) 1
{ 1 | 0 }

(2) 3⁺ 0,0,z
{ 3⁺₀₀₁ | 0 }

(3) 3⁻ 0,0,z
{ 3⁻₀₀₁ | 0 }

(4) 1̄ 0,0,0
{ 1̄ | 0 }

(5) 3̄⁺ 0,0,z; 0,0,0
{ 3̄⁺₀₀₁ | 0 }

(6) 3̄⁻ 0,0,z; 0,0,0
{ 3̄⁻₀₀₁ | 0 }

No. 67

p312

Symmetry operations

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, \bar{x} , 0
{ $2_{1\bar{1}0}$ 0 } | (5) 2 x, 2x, 0
{ 2_{120} 0 } | (6) 2 2x, x, 0
{ 2_{210} 0 } |

No. 68

p321

Symmetry operations

- | | | |
|------------------------------------|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, x, 0
{ 2_{110} 0 } | (5) 2 x, 0, 0
{ 2_{100} 0 } | (6) 2 0, y, 0
{ 2_{010} 0 } |

No. 69

p3m1

Symmetry operations

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x, \bar{x} , z
{ m_{110} 0 } | (5) m x, 2x, z
{ m_{100} 0 } | (6) m 2x, x, z
{ m_{010} 0 } |

No. 70

p31m

Symmetry operations

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x, x, z
{ $m_{1\bar{1}0}$ 0 } | (5) m x, 0, z
{ m_{120} 0 } | (6) m 0, y, z
{ m_{210} 0 } |

No. 71

 $p\bar{3}12/m$ **Symmetry operations**

- | | | |
|---|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 x, \bar{x} , 0
{ $2_{1\bar{1}0}$ 0 } | (5) 2 x, 2x, 0
{ 2_{120} 0 } | (6) 2 2x, x, 0
{ 2_{210} 0 } |
| (7) $\bar{1}$ 0,0,0
{ $\bar{1}$ 0 } | (8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ 0 } | (9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ 0 } |
| (10) m x, x, z
{ $m_{1\bar{1}0}$ 0 } | (11) m x, 0, z
{ m_{120} 0 } | (12) m 0, y, z
{ m_{210} 0 } |

No. 72

 $p\bar{3}2/m1$ **Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 3^+ 0,0,z
{ 3_{001}^+ | 0 }

(3) 3^- 0,0,z
{ 3_{001}^- | 0 }

(4) 2 x,x,0
{ 2_{110} | 0 }

(5) 2 x,0,0
{ 2_{100} | 0 }

(6) 2 0,y,0
{ 2_{010} | 0 }

(7) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ | 0 }

(9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ | 0 }

(10) m x, \bar{x} ,z
{ m_{110} | 0 }

(11) m x,2x,z
{ m_{100} | 0 }

(12) m 2x,x,z
{ m_{010} | 0 }

No. 73

p6

Symmetry operations

(1) 1
{ 1 | 0 }

(2) 3^+ 0,0,z
{ 3_{001}^+ | 0 }

(3) 3^- 0,0,z
{ 3_{001}^- | 0 }

(4) 2 0,0,z
{ 2_{001} | 0 }

(5) 6^- 0,0,z
{ 6_{001}^- | 0 }

(6) 6^+ 0,0,z
{ 6_{001}^+ | 0 }

No. 74

 $p\bar{6}$ **Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 3^+ 0,0,z
{ 3_{001}^+ | 0 }

(3) 3^- 0,0,z
{ 3_{001}^- | 0 }

(4) m x,y,0
{ m_{001} | 0 }

(5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ | 0 }

(6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ | 0 }

No. 75

p6/m

Symmetry operations

(1) 1
{ 1 | 0 }

(2) 3^+ 0,0,z
{ 3_{001}^+ | 0 }

(3) 3^- 0,0,z
{ 3_{001}^- | 0 }

(4) 2 0,0,z
{ 2_{001} | 0 }

(5) 6^- 0,0,z
{ 6_{001}^- | 0 }

(6) 6^+ 0,0,z
{ 6_{001}^+ | 0 }

(7) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(8) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ | 0 }

(9) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ | 0 }

(10) m x,y,0
{ m_{001} | 0 }

(11) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ | 0 }

(12) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ | 0 }

No. 76

p622

Symmetry operations

- | | | |
|---|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) 2 x,x,0
{ 2_{110} 0 } | (8) 2 x,0,0
{ 2_{100} 0 } | (9) 2 0,y,0
{ 2_{010} 0 } |
| (10) 2 x, \bar{x} ,0
{ $2_{1\bar{1}0}$ 0 } | (11) 2 x,2x,0
{ 2_{120} 0 } | (12) 2 2x,x,0
{ 2_{210} 0 } |

No. 77

p6mm

Symmetry operations

- | | | |
|--|--|--|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) 2 0,0,z
{ 2_{001} 0 } | (5) 6^- 0,0,z
{ 6_{001}^- 0 } | (6) 6^+ 0,0,z
{ 6_{001}^+ 0 } |
| (7) m x, \bar{x} ,z
{ m_{110} 0 } | (8) m x,2x,z
{ m_{100} 0 } | (9) m 2x,x,z
{ m_{010} 0 } |
| (10) m x,x,z
{ $m_{1\bar{1}0}$ 0 } | (11) m x,0,z
{ m_{120} 0 } | (12) m 0,y,z
{ m_{210} 0 } |

No. 78

 $p\bar{6}m2$ **Symmetry operations**

- | | | |
|---|---|---|
| (1) 1
{ 1 0 } | (2) 3^+ 0,0,z
{ 3_{001}^+ 0 } | (3) 3^- 0,0,z
{ 3_{001}^- 0 } |
| (4) m x,y,0
{ m_{001} 0 } | (5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ 0 } | (6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ 0 } |
| (7) m x, \bar{x} ,z
{ m_{110} 0 } | (8) m x,2x,z
{ m_{100} 0 } | (9) m 2x,x,z
{ m_{010} 0 } |
| (10) 2 x, \bar{x} ,0
{ $2_{1\bar{1}0}$ 0 } | (11) 2 x,2x,0
{ 2_{120} 0 } | (12) 2 2x,x,0
{ 2_{210} 0 } |

No. 79

 $p\bar{6}2m$ **Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 3^+ 0,0,z
{ 3_{001}^+ | 0 }

(3) 3^- 0,0,z
{ 3_{001}^- | 0 }

(4) m x,y,0
{ m_{001} | 0 }

(5) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ | 0 }

(6) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ | 0 }

(7) 2 x,x,0
{ 2_{110} | 0 }

(8) 2 x,0,0
{ 2_{100} | 0 }

(9) 2 0,y,0
{ 2_{010} | 0 }

(10) m x,x,z
{ $m_{1\bar{1}0}$ | 0 }

(11) m x,0,z
{ m_{120} | 0 }

(12) m 0,y,z
{ m_{210} | 0 }

No. 80

 $p6/mmm$ **Symmetry operations**

(1) 1
{ 1 | 0 }

(2) 3^+ 0,0,z
{ 3_{001}^+ | 0 }

(3) 3^- 0,0,z
{ 3_{001}^- | 0 }

(4) 2 0,0,z
{ 2_{001} | 0 }

(5) 6^- 0,0,z
{ 6_{001}^- | 0 }

(6) 6^+ 0,0,z
{ 6_{001}^+ | 0 }

(7) 2 x,x,0
{ 2_{110} | 0 }

(8) 2 x,0,0
{ 2_{100} | 0 }

(9) 2 0,y,0
{ 2_{010} | 0 }

(10) 2 x, \bar{x} ,0
{ $2_{1\bar{1}0}$ | 0 }

(11) 2 x,2x,0
{ 2_{120} | 0 }

(12) 2 2x,x,0
{ 2_{210} | 0 }

(13) $\bar{1}$ 0,0,0
{ $\bar{1}$ | 0 }

(14) $\bar{3}^+$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^+$ | 0 }

(15) $\bar{3}^-$ 0,0,z; 0,0,0
{ $\bar{3}_{001}^-$ | 0 }

(16) m x,y,0
{ m_{001} | 0 }

(17) $\bar{6}^-$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^-$ | 0 }

(18) $\bar{6}^+$ 0,0,z; 0,0,0
{ $\bar{6}_{001}^+$ | 0 }

(19) m x, \bar{x} ,z
{ m_{110} | 0 }

(20) m x,2x,z
{ m_{100} | 0 }

(21) m 2x,x,z
{ m_{010} | 0 }

(22) m x,x,z
{ $m_{1\bar{1}0}$ | 0 }

(23) m x,0,z
{ m_{120} | 0 }

(24) m 0,y,z
{ m_{210} | 0 }