

1. GENERAL RELATIONSHIPS AND TECHNIQUES

APPENDIX A1.4.4
Crystallographic space groups in reciprocal space

Table A1.4.4.1. Crystallographic space groups in reciprocal space

The table entries are described in detail in Section 1.4.4.1. The general format of an entry is

$$(n)\mathbf{h}^T\mathbf{P}_n : -\mathbf{h}^T\mathbf{t}_n$$

or

$$(n)\mathbf{h}^T\mathbf{P}_n ;$$

according as the phase-shift part of the entry is nonzero or zero modulo 2π , respectively.

Notes:

(1) For centrosymmetric space groups with the centre located at the unit-cell origin only those entries are given which correspond to symmetry operations not related by inversion. If the origin in such space groups is chosen elsewhere, all the entries corresponding to the operations of the point group are presented.

(2) For trigonal and hexagonal space groups referred to hexagonal axes the Miller–Bravais indices hkl are employed, and for the rhombohedral space groups referred to rhombohedral axes the indices are denoted by hkl (cf. *IT* 1, 1952).

Point group: 1 Triclinic Laue group: $\bar{1}$
$P1$ No. 1 (1)
(1) hkl :

Point group: $\bar{1}$ Triclinic Laue group: $\bar{1}$
$P\bar{1}$ No. 2 (2)
(1) hkl :

Point group: 2 Monoclinic Laue group: $2/m$	
$P2$ $P121$ Unique axis b No. 3 (3)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$P2$ $P112$ Unique axis c No. 3 (4)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$P2_1$ $P12_11$ Unique axis b No. 4 (5)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$: $-010/2$
$P2_1$ $P112_1$ Unique axis c No. 4 (6)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$: $-001/2$
$C2$ $C121$ Unique axis b No. 5 (7)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$C2$ $A121$ Unique axis b No. 5 (8)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$C2$ $I121$ Unique axis b No. 5 (9)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$C2$ $A112$ Unique axis c No. 5 (10)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$C2$ $B112$ Unique axis c No. 5 (11)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:
$C2$ $I112$ Unique axis c No. 5 (12)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:

Point group: m Monoclinic Laue group: $2/m$	
Pm $P1m1$ Unique axis b No. 6 (13)	
(1) hkl :	(2) $\bar{h}\bar{k}\bar{l}$:

Pm $P11m$ Unique axis c No. 6 (14)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Pc $P1c1$ Unique axis b No. 7 (15)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-001/2$
Pc $P1n1$ Unique axis b No. 7 (16)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-101/2$
Pc $P1a1$ Unique axis b No. 7 (17)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-100/2$
Pc $P11a$ Unique axis c No. 7 (18)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-100/2$
Pc $P11n$ Unique axis c No. 7 (19)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-110/2$
Pc $P11b$ Unique axis c No. 7 (20)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-010/2$
Cm $C1m1$ Unique axis b No. 8 (21)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Cm $A1m1$ Unique axis b No. 8 (22)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Cm $I1m1$ Unique axis b No. 8 (23)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Cm $A11m$ Unique axis c No. 8 (24)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Cm $B11m$ Unique axis c No. 8 (25)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Cm $I11m$ Unique axis c No. 8 (26)	
(1) hkl :	(2) $h\bar{k}\bar{l}$:
Cc $C1c1$ Unique axis b No. 9 (27)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-001/2$
Cc $A1n1$ Unique axis b No. 9 (28)	
(1) hkl :	(2) $h\bar{k}\bar{l}$: $-101/2$

1.4. SYMMETRY IN RECIPROCAL SPACE

Table A1.4.4.1 (cont.)

<i>Cc</i> <i>I1a1</i> Unique axis <i>b</i> No. 9 (29)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-100/2$
<i>Cc</i> <i>A11a</i> Unique axis <i>c</i> No. 9 (30)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-100/2$
<i>Cc</i> <i>B11n</i> Unique axis <i>c</i> No. 9 (31)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-110/2$
<i>Cc</i> <i>I11b</i> Unique axis <i>c</i> No. 9 (32)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-010/2$

Point group: 2/m Monoclinic Laue group: 2/m
<i>P2/m</i> <i>P12/m1</i> Unique axis <i>b</i> No. 10 (33)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>P2/m</i> <i>P112/m</i> Unique axis <i>c</i> No. 10 (34)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>P2₁/m</i> <i>P12₁/m1</i> Unique axis <i>b</i> No. 11 (35)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-010/2$
<i>P2₁/m</i> <i>P112₁/m</i> Unique axis <i>c</i> No. 11 (36)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-001/2$
<i>C2/m</i> <i>C12/m1</i> Unique axis <i>b</i> No. 12 (37)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>C2/m</i> <i>A12/m1</i> Unique axis <i>b</i> No. 12 (38)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>C2/m</i> <i>I12/m1</i> Unique axis <i>b</i> No. 12 (39)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>C2/m</i> <i>A112/m</i> Unique axis <i>c</i> No. 12 (40)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>C2/m</i> <i>B112/m</i> Unique axis <i>c</i> No. 12 (41)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>C2/m</i> <i>I112/m</i> Unique axis <i>c</i> No. 12 (42)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$:
<i>P2/c</i> <i>P12/c1</i> Unique axis <i>b</i> No. 13 (43)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-001/2$
<i>P2/c</i> <i>P12/n1</i> Unique axis <i>b</i> No. 13 (44)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-101/2$
<i>P2/c</i> <i>P12/a1</i> Unique axis <i>b</i> No. 13 (45)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-100/2$
<i>P2/c</i> <i>P112/a</i> Unique axis <i>c</i> No. 13 (46)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-100/2$
<i>P2/c</i> <i>P112/n</i> Unique axis <i>c</i> No. 13 (47)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-110/2$
<i>P2/c</i> <i>P112/b</i> Unique axis <i>c</i> No. 13 (48)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-010/2$

<i>P2₁/c</i> <i>P12₁/c1</i> Unique axis <i>b</i> No. 14 (49)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-011/2$
<i>P2₁/c</i> <i>P12₁/n1</i> Unique axis <i>b</i> No. 14 (50)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-111/2$
<i>P2₁/c</i> <i>P12₁/a1</i> Unique axis <i>b</i> No. 14 (51)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-110/2$
<i>P2₁/c</i> <i>P112₁/a</i> Unique axis <i>c</i> No. 14 (52)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-101/2$
<i>P2₁/c</i> <i>P112₁/n</i> Unique axis <i>c</i> No. 14 (53)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-111/2$
<i>P2₁/c</i> <i>P112₁/b</i> Unique axis <i>c</i> No. 14 (54)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-011/2$
<i>C2/c</i> <i>C12/c1</i> Unique axis <i>b</i> No. 15 (55)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-001/2$
<i>C2/c</i> <i>A12/n1</i> Unique axis <i>b</i> No. 15 (56)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-101/2$
<i>C2/c</i> <i>I12/a1</i> Unique axis <i>b</i> No. 15 (57)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-100/2$
<i>C2/c</i> <i>A112/a</i> Unique axis <i>c</i> No. 15 (58)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-100/2$
<i>C2/c</i> <i>B112/n</i> Unique axis <i>c</i> No. 15 (59)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-110/2$
<i>C2/c</i> <i>I112/b</i> Unique axis <i>c</i> No. 15 (60)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-010/2$

Point group: 222 Orthorhombic Laue group: mmm
<i>P222</i> No. 16 (61)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: (3) $\overline{hk\bar{l}}$: (4) $\overline{hk\bar{l}}$:
<i>P222₁</i> No. 17 (62)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-001/2$ (3) $\overline{hk\bar{l}}$: $-001/2$ (4) $\overline{hk\bar{l}}$:
<i>P2₁2₁2</i> No. 18 (63)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: (3) $\overline{hk\bar{l}}$: $-110/2$ (4) $\overline{hk\bar{l}}$: $-110/2$
<i>P2₁2₁2₁</i> No. 19 (64)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-101/2$ (3) $\overline{hk\bar{l}}$: $-011/2$ (4) $\overline{hk\bar{l}}$: $-110/2$
<i>C222₁</i> No. 20 (65)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: $-001/2$ (3) $\overline{hk\bar{l}}$: $-001/2$ (4) $\overline{hk\bar{l}}$:
<i>C222</i> No. 21 (66)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: (3) $\overline{hk\bar{l}}$: (4) $\overline{hk\bar{l}}$:
<i>F222</i> No. 22 (67)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: (3) $\overline{hk\bar{l}}$: (4) $\overline{hk\bar{l}}$:
<i>I222</i> No. 23 (68)
(1) <i>hkl</i> : (2) $\overline{hk\bar{l}}$: (3) $\overline{hk\bar{l}}$: (4) $\overline{hk\bar{l}}$:

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Table A1.4.4.1 (cont.)

<i>I</i> ₂ <i>1</i> <i>2</i> ₁ No. 24 (69)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -101/2 (3) $\bar{h}k\bar{l}$: -011/2 (4) $h\bar{k}\bar{l}$: -110/2

<i>Imm</i> 2 No. 44 (89)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: (4) $\bar{h}k\bar{l}$:
<i>Iba</i> 2 No. 45 (90)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -110/2 (4) $\bar{h}k\bar{l}$: -110/2
<i>Ima</i> 2 No. 46 (91)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -100/2 (4) $\bar{h}k\bar{l}$: -100/2

Point group: <i>mm</i>2 Orthorhombic Laue group: <i>mmm</i>
<i>Pmm</i> 2 No. 25 (70)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: (4) $\bar{h}k\bar{l}$:
<i>Pmc</i> 2 ₁ No. 26 (71)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -001/2 (3) $h\bar{k}\bar{l}$: -001/2 (4) $\bar{h}k\bar{l}$:
<i>Pcc</i> 2 No. 27 (72)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -001/2 (4) $\bar{h}k\bar{l}$: -001/2
<i>Pma</i> 2 No. 28 (73)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -100/2 (4) $\bar{h}k\bar{l}$: -100/2
<i>Pca</i> 2 ₁ No. 29 (74)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -001/2 (3) $h\bar{k}\bar{l}$: -100/2 (4) $\bar{h}k\bar{l}$: -101/2
<i>Pnc</i> 2 No. 30 (75)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -011/2 (4) $\bar{h}k\bar{l}$: -011/2
<i>Pmn</i> 2 ₁ No. 31 (76)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -101/2 (3) $h\bar{k}\bar{l}$: -101/2 (4) $\bar{h}k\bar{l}$:
<i>Pba</i> 2 No. 32 (77)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -110/2 (4) $\bar{h}k\bar{l}$: -110/2
<i>Pna</i> 2 ₁ No. 33 (78)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -001/2 (3) $h\bar{k}\bar{l}$: -110/2 (4) $\bar{h}k\bar{l}$: -111/2
<i>Pnn</i> 2 No. 34 (79)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -111/2 (4) $\bar{h}k\bar{l}$: -111/2
<i>Cmm</i> 2 No. 35 (80)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: (4) $\bar{h}k\bar{l}$:
<i>Cmc</i> 2 ₁ No. 36 (81)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -001/2 (3) $h\bar{k}\bar{l}$: -001/2 (4) $\bar{h}k\bar{l}$:
<i>Ccc</i> 2 No. 37 (82)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -001/2 (4) $\bar{h}k\bar{l}$: -001/2
<i>Amm</i> 2 No. 38 (83)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: (4) $\bar{h}k\bar{l}$:
<i>Abm</i> 2 No. 39 (84)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -010/2 (4) $\bar{h}k\bar{l}$: -010/2
<i>Ama</i> 2 No. 40 (85)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -100/2 (4) $\bar{h}k\bar{l}$: -100/2
<i>Aba</i> 2 No. 41 (86)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -110/2 (4) $\bar{h}k\bar{l}$: -110/2
<i>Fmm</i> 2 No. 42 (87)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: (4) $\bar{h}k\bar{l}$:
<i>Fdd</i> 2 No. 43 (88)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $h\bar{k}\bar{l}$: -313/4 (4) $\bar{h}k\bar{l}$: -133/4

Point group: <i>mmm</i> Orthorhombic Laue group: <i>mmm</i>
<i>Pmmm</i> No. 47 (92)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: (4) $h\bar{k}\bar{l}$:
<i>Pnnn</i> Origin 1 No. 48 (93)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: (4) $h\bar{k}\bar{l}$:
(5) $\bar{h}\bar{k}l$: -111/2 (6) $h\bar{k}\bar{l}$: -111/2 (7) $\bar{h}k\bar{l}$: -111/2 (8) $h\bar{k}\bar{l}$: -111/2
<i>Pnnn</i> Origin 2 No. 48 (94)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -110/2 (3) $\bar{h}k\bar{l}$: -101/2 (4) $h\bar{k}\bar{l}$: -011/2
<i>Pccm</i> No. 49 (95)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: -001/2 (4) $h\bar{k}\bar{l}$: -001/2
<i>Pban</i> Origin 1 No. 50 (96)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: (4) $h\bar{k}\bar{l}$:
(5) $\bar{h}\bar{k}l$: -110/2 (6) $h\bar{k}\bar{l}$: -110/2 (7) $\bar{h}k\bar{l}$: -110/2 (8) $h\bar{k}\bar{l}$: -110/2
<i>Pban</i> Origin 2 No. 50 (97)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -110/2 (3) $\bar{h}k\bar{l}$: -100/2 (4) $h\bar{k}\bar{l}$: -010/2
<i>Pmma</i> No. 51 (98)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -100/2 (3) $\bar{h}k\bar{l}$: (4) $h\bar{k}\bar{l}$: -100/2
<i>Pnna</i> No. 52 (99)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -100/2 (3) $\bar{h}k\bar{l}$: -111/2 (4) $h\bar{k}\bar{l}$: -011/2
<i>Pmna</i> No. 53 (100)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -101/2 (3) $\bar{h}k\bar{l}$: -101/2 (4) $h\bar{k}\bar{l}$:
<i>Pcca</i> No. 54 (101)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -100/2 (3) $\bar{h}k\bar{l}$: -001/2 (4) $h\bar{k}\bar{l}$: -101/2
<i>Pbam</i> No. 55 (102)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: -110/2 (4) $h\bar{k}\bar{l}$: -110/2
<i>Pccn</i> No. 56 (103)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -110/2 (3) $\bar{h}k\bar{l}$: -011/2 (4) $h\bar{k}\bar{l}$: -101/2
<i>Pbcm</i> No. 57 (104)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -001/2 (3) $\bar{h}k\bar{l}$: -011/2 (4) $h\bar{k}\bar{l}$: -010/2
<i>Pnmm</i> No. 58 (105)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: -111/2 (4) $h\bar{k}\bar{l}$: -111/2
<i>Pmnm</i> Origin 1 No. 59 (106)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: (3) $\bar{h}k\bar{l}$: -110/2 (4) $h\bar{k}\bar{l}$: -110/2
(5) $\bar{h}\bar{k}l$: -110/2 (6) $h\bar{k}\bar{l}$: -110/2 (7) $\bar{h}k\bar{l}$: (8) $h\bar{k}\bar{l}$:
<i>Pmnm</i> Origin 2 No. 59 (107)
(1) <i>hkl</i> : (2) $\bar{h}\bar{k}l$: -110/2 (3) $\bar{h}k\bar{l}$: -010/2 (4) $h\bar{k}\bar{l}$: -100/2

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Table A1.4.4.1 (cont.)

<i>Pbcn</i> No. 60 (108)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -111/2	(3) $\bar{h}k\bar{l}$: -001/2	(4) $h\bar{k}\bar{l}$: -110/2
<i>Pbca</i> No. 61 (109)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -101/2	(3) $\bar{h}k\bar{l}$: -011/2	(4) $h\bar{k}\bar{l}$: -110/2
<i>Pnma</i> No. 62 (110)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -101/2	(3) $\bar{h}k\bar{l}$: -010/2	(4) $h\bar{k}\bar{l}$: -111/2
<i>Cmcm</i> No. 63 (111)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -001/2	(3) $\bar{h}k\bar{l}$: -001/2	(4) $h\bar{k}\bar{l}$:
<i>Cmca</i> No. 64 (112)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -011/2	(3) $\bar{h}k\bar{l}$: -011/2	(4) $h\bar{k}\bar{l}$:
<i>Cmmm</i> No. 65 (113)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{h}k\bar{l}$:	(4) $h\bar{k}\bar{l}$:
<i>Cccm</i> No. 66 (114)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{h}k\bar{l}$: -001/2	(4) $h\bar{k}\bar{l}$: -001/2
<i>Cmma</i> No. 67 (115)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -010/2	(3) $\bar{h}k\bar{l}$: -010/2	(4) $h\bar{k}\bar{l}$:
<i>Ccca</i> Origin 1 No. 68 (116)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $\bar{h}k\bar{l}$:	(4) $h\bar{k}\bar{l}$: -110/2
(5) $\bar{h}\bar{k}l$: -011/2	(6) $hk\bar{l}$: -101/2	(7) $\bar{h}\bar{k}l$: -011/2	(8) $\bar{h}k\bar{l}$: -101/2
<i>Ccca</i> Origin 2 No. 68 (117)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -100/2	(3) $\bar{h}k\bar{l}$: -001/2	(4) $h\bar{k}\bar{l}$: -101/2
<i>Fmmm</i> No. 69 (118)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{h}k\bar{l}$:	(4) $h\bar{k}\bar{l}$:
<i>Fddd</i> Origin 1 No. 70 (119)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{h}k\bar{l}$:	(4) $h\bar{k}\bar{l}$:
(5) $\bar{h}\bar{k}l$: -111/4	(6) $hk\bar{l}$: -111/4	(7) $\bar{h}\bar{k}l$: -111/4	(8) $\bar{h}k\bar{l}$: -111/4
<i>Fddd</i> Origin 2 No. 70 (120)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -330/4	(3) $\bar{h}k\bar{l}$: -303/4	(4) $h\bar{k}\bar{l}$: -033/4
<i>Immm</i> No. 71 (121)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{h}k\bar{l}$:	(4) $h\bar{k}\bar{l}$:
<i>Ibam</i> No. 72 (122)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{h}k\bar{l}$: -110/2	(4) $h\bar{k}\bar{l}$: -110/2
<i>Ibca</i> No. 73 (123)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -101/2	(3) $\bar{h}k\bar{l}$: -011/2	(4) $h\bar{k}\bar{l}$: -110/2
<i>Imma</i> No. 74 (124)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -010/2	(3) $\bar{h}k\bar{l}$: -010/2	(4) $h\bar{k}\bar{l}$:

Point group: $\bar{4}$ Tetragonal Laue group: $4/m$			
<i>P4</i> No. 75 (125)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
<i>P4₁</i> No. 76 (126)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -001/2	(3) $k\bar{h}l$: -001/4	(4) $\bar{k}hl$: -003/4

<i>P4₂</i> No. 77 (127)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -001/2	(4) $\bar{k}hl$: -001/2
<i>P4₃</i> No. 78 (128)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -001/2	(3) $k\bar{h}l$: -003/4	(4) $\bar{k}hl$: -001/4
<i>I4</i> No. 79 (129)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
<i>I4₁</i> No. 80 (130)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -111/2	(3) $k\bar{h}l$: -021/4	(4) $\bar{k}hl$: -203/4

Point group: $\bar{4}$ Tetragonal Laue group: $4/m$			
<i>P$\bar{4}$</i> No. 81 (131)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
<i>I$\bar{4}$</i> No. 82 (132)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:

Point group: $4/m$ Tetragonal Laue group: $4/m$			
<i>P4/m</i> No. 83 (133)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
<i>P4₂/m</i> No. 84 (134)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -001/2	(4) $\bar{k}hl$: -001/2
<i>P4/n</i> Origin 1 No. 85 (135)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -110/2	(4) $\bar{k}hl$: -110/2
(5) $\bar{h}\bar{k}l$: -110/2	(6) $hk\bar{l}$: -110/2	(7) $k\bar{h}l$:	(8) $\bar{k}hl$:
<i>P4/n</i> Origin 2 No. 85 (136)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -100/2	(4) $\bar{k}hl$: -010/2
<i>P4₂/n</i> Origin 1 No. 86 (137)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -111/2	(4) $\bar{k}hl$: -111/2
(5) $\bar{h}\bar{k}l$: -111/2	(6) $hk\bar{l}$: -111/2	(7) $k\bar{h}l$:	(8) $\bar{k}hl$:
<i>P4₂/n</i> Origin 2 No. 86 (138)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -011/2	(4) $\bar{k}hl$: -101/2
<i>I4/m</i> No. 87 (139)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
<i>I4₁/a</i> Origin 1 No. 88 (140)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -111/2	(3) $k\bar{h}l$: -021/4	(4) $\bar{k}hl$: -203/4
(5) $\bar{h}\bar{k}l$: -021/4	(6) $hk\bar{l}$: -203/4	(7) $k\bar{h}l$:	(8) $\bar{k}hl$: -111/2
<i>I4₁/a</i> Origin 2 No. 88 (141)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$: -101/2	(3) $k\bar{h}l$: -311/4	(4) $\bar{k}hl$: -333/4

Point group: 422 Tetragonal Laue group: $4/mmm$			
<i>P422</i> No. 89 (142)			
(1) <i>hkl</i> :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$:	(6) $hk\bar{l}$:	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:

1. GENERAL RELATIONSHIPS AND TECHNIQUES

Table A1.4.4.1 (cont.)

<i>P4₂2</i> No. 90 (143)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -110/2	(4) $\overline{kh}l$: -110/2
(5) \overline{hkl} : -110/2	(6) \overline{hkl} : -110/2	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$:
<i>P4₁22</i> No. 91 (144)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -001/2	(3) $k\overline{hl}$: -001/4	(4) $\overline{kh}l$: -003/4
(5) \overline{hkl} :	(6) \overline{hkl} : -001/2	(7) <i>kh</i> \overline{l} : -003/4	(8) $\overline{kh}l$: -001/4
<i>P4₁2₁2</i> No. 92 (145)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -001/2	(3) $k\overline{hl}$: -221/4	(4) $\overline{kh}l$: -223/4
(5) \overline{hkl} : -221/4	(6) \overline{hkl} : -223/4	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$: -001/2
<i>P4₂22</i> No. 93 (146)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -001/2	(4) $\overline{kh}l$: -001/2
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) <i>kh</i> \overline{l} : -001/2	(8) $\overline{kh}l$: -001/2
<i>P4₂2₁2</i> No. 94 (147)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -111/2	(4) $\overline{kh}l$: -111/2
(5) \overline{hkl} : -111/2	(6) \overline{hkl} : -111/2	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$:
<i>P4₃22</i> No. 95 (148)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -001/2	(3) $k\overline{hl}$: -003/4	(4) $\overline{kh}l$: -001/4
(5) \overline{hkl} :	(6) \overline{hkl} : -001/2	(7) <i>kh</i> \overline{l} : -001/4	(8) $\overline{kh}l$: -003/4
<i>P4₃2₁2</i> No. 96 (149)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -001/2	(3) $k\overline{hl}$: -223/4	(4) $\overline{kh}l$: -221/4
(5) \overline{hkl} : -223/4	(6) \overline{hkl} : -221/4	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$: -001/2
<i>I422</i> No. 97 (150)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$:
<i>I4₁22</i> No. 98 (151)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -111/2	(3) $k\overline{hl}$: -021/4	(4) $\overline{kh}l$: -203/4
(5) \overline{hkl} : -203/4	(6) \overline{hkl} : -021/4	(7) <i>kh</i> \overline{l} : -111/2	(8) $\overline{kh}l$:

Point group: 4mm Tetragonal Laue group: 4/mmm			
<i>P4mm</i> No. 99 (152)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) $\overline{kh}l$:	(8) <i>kh</i> \overline{l} :
<i>P4bm</i> No. 100 (153)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -110/2	(6) \overline{hkl} : -110/2	(7) $\overline{kh}l$: -110/2	(8) <i>kh</i> \overline{l} : -110/2
<i>P4₂cm</i> No. 101 (154)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -001/2	(4) $\overline{kh}l$: -001/2
(5) \overline{hkl} : -001/2	(6) \overline{hkl} : -001/2	(7) $\overline{kh}l$:	(8) <i>kh</i> \overline{l} :
<i>P4₂nm</i> No. 102 (155)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -111/2	(4) $\overline{kh}l$: -111/2
(5) \overline{hkl} : -111/2	(6) \overline{hkl} : -111/2	(7) $\overline{kh}l$:	(8) <i>kh</i> \overline{l} :
<i>P4cc</i> No. 103 (156)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -001/2	(6) \overline{hkl} : -001/2	(7) $\overline{kh}l$: -001/2	(8) <i>kh</i> \overline{l} : -001/2
<i>P4nc</i> No. 104 (157)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -111/2	(6) \overline{hkl} : -111/2	(7) $\overline{kh}l$: -111/2	(8) <i>kh</i> \overline{l} : -111/2

<i>P4₂mc</i> No. 105 (158)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -001/2	(4) $\overline{kh}l$: -001/2
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) $\overline{kh}l$: -001/2	(8) <i>kh</i> \overline{l} : -001/2
<i>P4₂bc</i> No. 106 (159)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$: -001/2	(4) $\overline{kh}l$: -001/2
(5) \overline{hkl} : -110/2	(6) \overline{hkl} : -110/2	(7) $\overline{kh}l$: -111/2	(8) <i>kh</i> \overline{l} : -111/2
<i>I4mm</i> No. 107 (160)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) $\overline{kh}l$:	(8) <i>kh</i> \overline{l} :
<i>I4cm</i> No. 108 (161)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -001/2	(6) \overline{hkl} : -001/2	(7) $\overline{kh}l$: -001/2	(8) <i>kh</i> \overline{l} : -001/2
<i>I4₁md</i> No. 109 (162)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -111/2	(3) $k\overline{hl}$: -021/4	(4) $\overline{kh}l$: -203/4
(5) \overline{hkl} :	(6) \overline{hkl} : -111/2	(7) $\overline{kh}l$: -203/4	(8) <i>kh</i> \overline{l} : -021/4
<i>I4₁cd</i> No. 110 (163)			
(1) <i>hkl</i> :	(2) \overline{hkl} : -111/2	(3) $k\overline{hl}$: -021/4	(4) $\overline{kh}l$: -203/4
(5) \overline{hkl} : -001/2	(6) \overline{hkl} : -110/2	(7) $\overline{kh}l$: -201/4	(8) <i>kh</i> \overline{l} : -023/4

Point group: 42m Tetragonal Laue group: 4/mmm			
<i>P42m</i> No. 111 (164)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) $\overline{kh}l$:	(8) <i>kh</i> \overline{l} :
<i>P42c</i> No. 112 (165)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -001/2	(6) \overline{hkl} : -001/2	(7) $\overline{kh}l$: -001/2	(8) <i>kh</i> \overline{l} : -001/2
<i>P42₁m</i> No. 113 (166)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -110/2	(6) \overline{hkl} : -110/2	(7) $\overline{kh}l$: -110/2	(8) <i>kh</i> \overline{l} : -110/2
<i>P42₁c</i> No. 114 (167)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -111/2	(6) \overline{hkl} : -111/2	(7) $\overline{kh}l$: -111/2	(8) <i>kh</i> \overline{l} : -111/2
<i>P4m2</i> No. 115 (168)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$:
<i>P4c2</i> No. 116 (169)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -001/2	(6) \overline{hkl} : -001/2	(7) <i>kh</i> \overline{l} : -001/2	(8) $\overline{kh}l$: -001/2
<i>P4b2</i> No. 117 (170)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -110/2	(6) \overline{hkl} : -110/2	(7) <i>kh</i> \overline{l} : -110/2	(8) $\overline{kh}l$: -110/2
<i>P4n2</i> No. 118 (171)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} : -111/2	(6) \overline{hkl} : -111/2	(7) <i>kh</i> \overline{l} : -111/2	(8) $\overline{kh}l$: -111/2
<i>I4m2</i> No. 119 (172)			
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) $k\overline{hl}$:	(4) $\overline{kh}l$:
(5) \overline{hkl} :	(6) \overline{hkl} :	(7) <i>kh</i> \overline{l} :	(8) $\overline{kh}l$:

1.4. SYMMETRY IN RECIPROCAL SPACE

Table A1.4.4.1 (cont.)

$I\bar{4}c2$ No. 120 (173)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{k}h\bar{l}$:	(4) $k\bar{h}l$:
(5) $\bar{h}\bar{k}l$: -001/2	(6) $\bar{h}kl$: -001/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}h\bar{l}$: -001/2
$I\bar{4}2m$ No. 121 (174)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{k}h\bar{l}$:	(4) $k\bar{h}l$:
(5) $\bar{h}\bar{k}l$:	(6) $\bar{h}kl$:	(7) $\bar{k}hl$:	(8) $kh\bar{l}$:
$I\bar{4}2d$ No. 122 (175)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $\bar{k}h\bar{l}$:	(4) $k\bar{h}l$:
(5) $\bar{h}\bar{k}l$: -203/4	(6) $\bar{h}kl$: -203/4	(7) $\bar{k}hl$: -021/4	(8) $kh\bar{l}$: -021/4

Point group: $4/mmm$ Tetragonal Laue group: $4/mmm$			
$P4/mmm$ No. 123 (176)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$:	(6) $\bar{h}kl$:	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
$P4/mcc$ No. 124 (177)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$: -001/2	(6) $\bar{h}kl$: -001/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}hl$: -001/2
$P4/nbm$ Origin 1 No. 125 (178)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$:	(6) $\bar{h}kl$:	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
(9) $\bar{h}\bar{k}l$: -110/2	(10) $\bar{h}kl$: -110/2	(11) $\bar{k}h\bar{l}$: -110/2	(12) $k\bar{h}l$: -110/2
(13) $\bar{h}\bar{k}l$: -110/2	(14) $\bar{h}kl$: -110/2	(15) $\bar{k}hl$: -110/2	(16) $kh\bar{l}$: -110/2
$P4/nbm$ Origin 2 No. 125 (179)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -100/2	(4) $\bar{k}hl$: -010/2
(5) $\bar{h}\bar{k}l$: -100/2	(6) $\bar{h}kl$: -010/2	(7) $kh\bar{l}$:	(8) $\bar{k}hl$: -110/2
$P4/nnc$ Origin 1 No. 126 (180)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$:	(6) $\bar{h}kl$:	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
(9) $\bar{h}\bar{k}l$: -111/2	(10) $\bar{h}kl$: -111/2	(11) $\bar{k}h\bar{l}$: -111/2	(12) $k\bar{h}l$: -111/2
(13) $\bar{h}\bar{k}l$: -111/2	(14) $\bar{h}kl$: -111/2	(15) $\bar{k}hl$: -111/2	(16) $kh\bar{l}$: -111/2
$P4/nnc$ Origin 2 No. 126 (181)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -100/2	(4) $\bar{k}hl$: -010/2
(5) $\bar{h}\bar{k}l$: -101/2	(6) $\bar{h}kl$: -011/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}hl$: -111/2
$P4/mbm$ No. 127 (182)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$: -110/2	(6) $\bar{h}kl$: -110/2	(7) $kh\bar{l}$: -110/2	(8) $\bar{k}hl$: -110/2
$P4/mnc$ No. 128 (183)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}\bar{k}l$: -111/2	(6) $\bar{h}kl$: -111/2	(7) $kh\bar{l}$: -111/2	(8) $\bar{k}hl$: -111/2
$P4/nmm$ Origin 1 No. 129 (184)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -110/2	(4) $\bar{k}hl$: -110/2
(5) $\bar{h}\bar{k}l$: -110/2	(6) $\bar{h}kl$: -110/2	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
(9) $\bar{h}\bar{k}l$: -110/2	(10) $\bar{h}kl$: -110/2	(11) $\bar{k}h\bar{l}$:	(12) $k\bar{h}l$:
(13) $\bar{h}\bar{k}l$:	(14) $\bar{h}kl$:	(15) $\bar{k}hl$: -110/2	(16) $kh\bar{l}$: -110/2
$P4/nmm$ Origin 2 No. 129 (185)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -100/2	(4) $\bar{k}hl$: -010/2
(5) $\bar{h}\bar{k}l$: -010/2	(6) $\bar{h}kl$: -100/2	(7) $kh\bar{l}$: -110/2	(8) $\bar{k}hl$:

$P4/ncc$ Origin 1 No. 130 (186)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -110/2	(4) $\bar{k}hl$: -110/2
(5) $\bar{h}\bar{k}l$: -111/2	(6) $\bar{h}kl$: -111/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}hl$: -001/2
(9) $\bar{h}\bar{k}l$: -110/2	(10) $\bar{h}kl$: -110/2	(11) $\bar{k}h\bar{l}$:	(12) $k\bar{h}l$:
(13) $\bar{h}\bar{k}l$: -001/2	(14) $\bar{h}kl$: -001/2	(15) $\bar{k}hl$: -111/2	(16) $kh\bar{l}$: -111/2
$P4/ncc$ Origin 2 No. 130 (187)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -100/2	(4) $\bar{k}hl$: -010/2
(5) $\bar{h}\bar{k}l$: -011/2	(6) $\bar{h}kl$: -101/2	(7) $kh\bar{l}$: -111/2	(8) $\bar{k}hl$: -001/2
PA_2/mmc No. 131 (188)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -001/2	(4) $\bar{k}hl$: -001/2
(5) $\bar{h}\bar{k}l$:	(6) $\bar{h}kl$:	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}hl$: -001/2
PA_2/mcm No. 132 (189)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -001/2	(4) $\bar{k}hl$: -001/2
(5) $\bar{h}\bar{k}l$: -001/2	(6) $\bar{h}kl$: -001/2	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
PA_2/nbc Origin 1 No. 133 (190)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -111/2	(4) $\bar{k}hl$: -111/2
(5) $\bar{h}\bar{k}l$: -001/2	(6) $\bar{h}kl$: -001/2	(7) $kh\bar{l}$: -110/2	(8) $\bar{k}hl$: -110/2
(9) $\bar{h}\bar{k}l$: -111/2	(10) $\bar{h}kl$: -111/2	(11) $\bar{k}h\bar{l}$:	(12) $k\bar{h}l$:
(13) $\bar{h}\bar{k}l$: -110/2	(14) $\bar{h}kl$: -110/2	(15) $\bar{k}hl$: -001/2	(16) $kh\bar{l}$: -001/2
PA_2/nbc Origin 2 No. 133 (191)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -101/2	(4) $\bar{k}hl$: -011/2
(5) $\bar{h}\bar{k}l$: -100/2	(6) $\bar{h}kl$: -010/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}hl$: -111/2
PA_2/nmm Origin 1 No. 134 (192)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -111/2	(4) $\bar{k}hl$: -111/2
(5) $\bar{h}\bar{k}l$:	(6) $\bar{h}kl$:	(7) $kh\bar{l}$: -111/2	(8) $\bar{k}hl$: -111/2
(9) $\bar{h}\bar{k}l$: -111/2	(10) $\bar{h}kl$: -111/2	(11) $\bar{k}h\bar{l}$:	(12) $k\bar{h}l$:
(13) $\bar{h}\bar{k}l$: -111/2	(14) $\bar{h}kl$: -111/2	(15) $\bar{k}hl$:	(16) $kh\bar{l}$:
PA_2/nmm Origin 2 No. 134 (193)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -101/2	(4) $\bar{k}hl$: -011/2
(5) $\bar{h}\bar{k}l$: -101/2	(6) $\bar{h}kl$: -011/2	(7) $kh\bar{l}$:	(8) $\bar{k}hl$: -110/2
PA_2/mbc No. 135 (194)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -001/2	(4) $\bar{k}hl$: -001/2
(5) $\bar{h}\bar{k}l$: -110/2	(6) $\bar{h}kl$: -110/2	(7) $kh\bar{l}$: -111/2	(8) $\bar{k}hl$: -111/2
PA_2/mnm No. 136 (195)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -111/2	(4) $\bar{k}hl$: -111/2
(5) $\bar{h}\bar{k}l$: -111/2	(6) $\bar{h}kl$: -111/2	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
PA_2/nmc Origin 1 No. 137 (196)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -111/2	(4) $\bar{k}hl$: -111/2
(5) $\bar{h}\bar{k}l$: -111/2	(6) $\bar{h}kl$: -111/2	(7) $kh\bar{l}$:	(8) $\bar{k}hl$:
(9) $\bar{h}\bar{k}l$: -111/2	(10) $\bar{h}kl$: -111/2	(11) $\bar{k}h\bar{l}$:	(12) $k\bar{h}l$:
(13) $\bar{h}\bar{k}l$:	(14) $\bar{h}kl$:	(15) $\bar{k}hl$: -111/2	(16) $kh\bar{l}$: -111/2
PA_2/nmc Origin 2 No. 137 (197)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -101/2	(4) $\bar{k}hl$: -011/2
(5) $\bar{h}\bar{k}l$: -010/2	(6) $\bar{h}kl$: -100/2	(7) $kh\bar{l}$: -111/2	(8) $\bar{k}hl$: -001/2
PA_2/nmc Origin 1 No. 138 (198)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$: -111/2	(4) $\bar{k}hl$: -111/2
(5) $\bar{h}\bar{k}l$: -110/2	(6) $\bar{h}kl$: -110/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}hl$: -001/2
(9) $\bar{h}\bar{k}l$: -111/2	(10) $\bar{h}kl$: -111/2	(11) $\bar{k}h\bar{l}$:	(12) $k\bar{h}l$:
(13) $\bar{h}\bar{k}l$: -001/2	(14) $\bar{h}kl$: -001/2	(15) $\bar{k}hl$: -110/2	(16) $kh\bar{l}$: -110/2

1. GENERAL RELATIONSHIPS AND TECHNIQUES

Table A1.4.4.1 (cont.)

$P4_2/nm$ Origin 2 No. 138 (199)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -110/2	(3) $k\bar{h}l$: -101/2	(4) $\bar{k}hl$: -011/2
(5) $\bar{h}k\bar{l}$: -011/2	(6) $h\bar{k}l$: -101/2	(7) $kh\bar{l}$: -110/2	(8) $\bar{k}\bar{h}l$:
$I4/mmm$ No. 139 (200)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}k\bar{l}$:	(6) $h\bar{k}l$:	(7) $kh\bar{l}$:	(8) $\bar{k}\bar{h}l$:
$I4/mcm$ No. 140 (201)			
(1) hkl :	(2) $\bar{h}\bar{k}l$:	(3) $k\bar{h}l$:	(4) $\bar{k}hl$:
(5) $\bar{h}k\bar{l}$: -001/2	(6) $h\bar{k}l$: -001/2	(7) $kh\bar{l}$: -001/2	(8) $\bar{k}\bar{h}l$: -001/2
$I4_1/amd$ Origin 1 No. 141 (202)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -111/2	(3) $k\bar{h}l$: -021/4	(4) $\bar{k}hl$: -203/4
(5) $\bar{h}k\bar{l}$: -203/4	(6) $h\bar{k}l$: -021/4	(7) $kh\bar{l}$: -111/2	(8) $\bar{k}\bar{h}l$:
(9) $\bar{h}k\bar{l}$: -021/4	(10) $h\bar{k}l$: -203/4	(11) $\bar{k}\bar{h}l$:	(12) $k\bar{h}l$: -111/2
(13) $h\bar{k}l$: -111/2	(14) $\bar{h}k\bar{l}$:	(15) $\bar{k}\bar{h}l$: -203/4	(16) $kh\bar{l}$: -021/4
$I4_1/amd$ Origin 2 No. 141 (203)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -101/2	(3) $k\bar{h}l$: -131/4	(4) $\bar{k}hl$: -113/4
(5) $\bar{h}k\bar{l}$: -101/2	(6) $h\bar{k}l$:	(7) $kh\bar{l}$: -131/4	(8) $\bar{k}\bar{h}l$: -113/4
$I4_1/acd$ Origin 1 No. 142 (204)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -111/2	(3) $k\bar{h}l$: -021/4	(4) $\bar{k}hl$: -203/4
(5) $\bar{h}k\bar{l}$: -201/4	(6) $h\bar{k}l$: -023/4	(7) $kh\bar{l}$: -110/2	(8) $\bar{k}\bar{h}l$: -001/2
(9) $\bar{h}k\bar{l}$: -021/4	(10) $h\bar{k}l$: -203/4	(11) $\bar{k}\bar{h}l$:	(12) $k\bar{h}l$: -111/2
(13) $h\bar{k}l$: -110/2	(14) $\bar{h}k\bar{l}$: -001/2	(15) $\bar{k}\bar{h}l$: -201/4	(16) $kh\bar{l}$: -023/4
$I4_1/acd$ Origin 2 No. 142 (205)			
(1) hkl :	(2) $\bar{h}\bar{k}l$: -101/2	(3) $k\bar{h}l$: -131/4	(4) $\bar{k}hl$: -113/4
(5) $\bar{h}k\bar{l}$: -100/2	(6) $h\bar{k}l$: -001/2	(7) $kh\bar{l}$: -133/4	(8) $\bar{k}\bar{h}l$: -111/4

Point group: 32	Trigonal	Laue group: $\bar{3}m$
$P312$ No. 149 (214)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $\bar{k}\bar{h}l$:	(5) $\bar{h}i\bar{l}$:	(6) $\bar{i}k\bar{l}$:
$P321$ No. 150 (215)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $k\bar{h}l$:	(5) $\bar{h}i\bar{l}$:	(6) $\bar{i}k\bar{l}$:
$P3_112$ No. 151 (216)		
(1) hkl :	(2) kil : -001/3	(3) ihl : -002/3
(4) $\bar{k}\bar{h}l$: -002/3	(5) $\bar{h}i\bar{l}$: -001/3	(6) $\bar{i}k\bar{l}$:
$P3_121$ No. 152 (217)		
(1) hkl :	(2) kil : -001/3	(3) ihl : -002/3
(4) $k\bar{h}l$:	(5) $\bar{h}i\bar{l}$: -002/3	(6) $\bar{i}k\bar{l}$: -001/3
$P3_212$ No. 153 (218)		
(1) hkl :	(2) kil : -002/3	(3) ihl : -001/3
(4) $\bar{k}\bar{h}l$: -001/3	(5) $\bar{h}i\bar{l}$: -002/3	(6) $\bar{i}k\bar{l}$:
$P3_221$ No. 154 (219)		
(1) hkl :	(2) kil : -002/3	(3) ihl : -001/3
(4) $k\bar{h}l$:	(5) $\bar{h}i\bar{l}$: -001/3	(6) $\bar{i}k\bar{l}$: -002/3
$R32$ (hexagonal axes) No. 155 (220)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $k\bar{h}l$:	(5) $\bar{h}i\bar{l}$:	(6) $\bar{i}k\bar{l}$:
$R32$ (rhombohedral axes) No. 155 (221)		
(1) hkl :	(2) klh :	(3) lkh :
(4) $\bar{k}\bar{h}l$:	(5) $\bar{h}l\bar{k}$:	(6) $\bar{l}k\bar{h}$:

Point group: 3	Trigonal	Laue group: $\bar{3}$
$P3$ No. 143 (206)		
(1) hkl :	(2) kil :	(3) ihl :
$P3_1$ No. 144 (207)		
(1) hkl :	(2) kil : -001/3	(3) ihl : -002/3
$P3_2$ No. 145 (208)		
(1) hkl :	(2) kil : -002/3	(3) ihl : -001/3
$R3$ (hexagonal axes) No. 146 (209)		
(1) hkl :	(2) kil :	(3) ihl :
$R3$ (rhombohedral axes) No. 146 (210)		
(1) hkl :	(2) klh :	(3) lkh :

Point group: $\bar{3}$	Trigonal	Laue group: $\bar{3}$
$P\bar{3}$ No. 147 (211)		
(1) hkl :	(2) kil :	(3) ihl :
$R\bar{3}$ (hexagonal axes) No. 148 (212)		
(1) hkl :	(2) kil :	(3) ihl :
$R\bar{3}$ (rhombohedral axes) No. 148 (213)		
(1) hkl :	(2) klh :	(3) lkh :

Point group: $3m$	Trigonal	Laue group: $\bar{3}m$
$P3m1$ No. 156 (222)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $\bar{k}\bar{h}l$:	(5) $\bar{h}i\bar{l}$:	(6) $\bar{i}k\bar{l}$:
$P31m$ No. 157 (223)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $k\bar{h}l$:	(5) $\bar{h}i\bar{l}$:	(6) $\bar{i}k\bar{l}$:
$P3c1$ No. 158 (224)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $\bar{k}\bar{h}l$: -001/2	(5) $\bar{h}i\bar{l}$: -001/2	(6) $\bar{i}k\bar{l}$: -001/2
$P31c$ No. 159 (225)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $k\bar{h}l$: -001/2	(5) $\bar{h}i\bar{l}$: -001/2	(6) $\bar{i}k\bar{l}$: -001/2
$R3m$ (hexagonal axes) No. 160 (226)		
(1) hkl :	(2) kil :	(3) ihl :
(4) $\bar{k}\bar{h}l$:	(5) $\bar{h}i\bar{l}$:	(6) $\bar{i}k\bar{l}$:
$R3m$ (rhombohedral axes) No. 160 (227)		
(1) hkl :	(2) klh :	(3) lkh :
(4) $k\bar{h}l$:	(5) $h\bar{l}k$:	(6) $l\bar{k}h$:

1.4. SYMMETRY IN RECIPROCAL SPACE

Table A1.4.4.1 (cont.)

<i>R</i> 3 <i>c</i> (hexagonal axes) No. 161 (228)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$: -001/2	(5) $\bar{h}\bar{i}l$: -001/2	(6) $\bar{i}k\bar{l}$: -001/2
<i>R</i> 3 <i>c</i> (rhombohedral axes) No. 161 (229)		
(1) <i>hkl</i> :	(2) <i>klh</i> :	(3) <i>lkh</i> :
(4) <i>khl</i> : -111/2	(5) <i>hlk</i> : -111/2	(6) <i>lkh</i> : -111/2

<i>P</i> 6 ₄ No. 172 (242)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -001/3	(3) <i>ihl</i> : -002/3
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$: -001/3	(6) $\bar{i}h\bar{l}$: -002/3
<i>P</i> 6 ₃ No. 173 (243)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{h}k\bar{l}$: -001/2	(5) $\bar{k}i\bar{l}$: -001/2	(6) $\bar{i}h\bar{l}$: -001/2

Point group: $\bar{3}m$ Trigonal Laue group: $\bar{3}m$		
<i>P</i> $\bar{3}$ 1 <i>m</i> No. 162 (230)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$:	(5) $\bar{h}\bar{i}l$:	(6) $\bar{i}k\bar{l}$:
<i>P</i> $\bar{3}$ 1 <i>c</i> No. 163 (231)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$: -001/2	(5) $\bar{h}\bar{i}l$: -001/2	(6) $\bar{i}k\bar{l}$: -001/2
<i>P</i> $\bar{3}$ <i>m</i> 1 No. 164 (232)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$:	(5) $\bar{h}\bar{i}l$:	(6) $\bar{i}k\bar{l}$:
<i>P</i> $\bar{3}$ <i>c</i> 1 No. 165 (233)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$: -001/2	(5) $\bar{h}\bar{i}l$: -001/2	(6) $\bar{i}k\bar{l}$: -001/2
<i>R</i> $\bar{3}$ <i>m</i> (hexagonal axes) No. 166 (234)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$:	(5) $\bar{h}\bar{i}l$:	(6) $\bar{i}k\bar{l}$:
<i>R</i> $\bar{3}$ <i>m</i> (rhombohedral axes) No. 166 (235)		
(1) <i>hkl</i> :	(2) <i>klh</i> :	(3) <i>lkh</i> :
(4) $\bar{k}h\bar{l}$:	(5) $\bar{h}\bar{i}l$:	(6) $\bar{i}k\bar{l}$:
<i>R</i> $\bar{3}$ <i>c</i> (hexagonal axes) No. 167 (236)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{k}h\bar{l}$: -001/2	(5) $\bar{h}\bar{i}l$: -001/2	(6) $\bar{i}k\bar{l}$: -001/2
<i>R</i> $\bar{3}$ <i>c</i> (rhombohedral axes) No. 167 (237)		
(1) <i>hkl</i> :	(2) <i>klh</i> :	(3) <i>lkh</i> :
(4) $\bar{k}h\bar{l}$: -111/2	(5) $\bar{h}\bar{i}l$: -111/2	(6) $\bar{i}k\bar{l}$: -111/2

Point group: $\bar{6}$ Hexagonal Laue group: <i>6/m</i>		
<i>P</i> $\bar{6}$ No. 174 (244)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$:	(6) $\bar{i}h\bar{l}$:

Point group: <i>6/m</i> Hexagonal Laue group: <i>6/m</i>		
<i>P</i> 6/ <i>m</i> No. 175 (245)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$:	(6) $\bar{i}h\bar{l}$:
<i>P</i> 6 ₃ / <i>m</i> No. 176 (246)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{h}k\bar{l}$: -001/2	(5) $\bar{k}i\bar{l}$: -001/2	(6) $\bar{i}h\bar{l}$: -001/2

Point group: 622 Hexagonal Laue group: <i>6/mmm</i>		
<i>P</i> 622 No. 177 (247)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$:	(6) $\bar{i}h\bar{l}$:
(7) $\bar{k}h\bar{l}$:	(8) $\bar{h}\bar{i}l$:	(9) $\bar{i}k\bar{l}$:
(10) $\bar{k}h\bar{l}$:	(11) $\bar{h}\bar{i}l$:	(12) $\bar{i}k\bar{l}$:
<i>P</i> 6 ₁ 22 No. 178 (248)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -001/3	(3) <i>ihl</i> : -002/3
(4) $\bar{h}k\bar{l}$: -001/2	(5) $\bar{k}i\bar{l}$: -005/6	(6) $\bar{i}h\bar{l}$: -001/6
(7) $\bar{k}h\bar{l}$: -001/3	(8) $\bar{h}\bar{i}l$:	(9) $\bar{i}k\bar{l}$: -002/3
(10) $\bar{k}h\bar{l}$: -005/6	(11) $\bar{h}\bar{i}l$: -001/2	(12) $\bar{i}k\bar{l}$: -001/6
<i>P</i> 6 ₂ 22 No. 179 (249)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -002/3	(3) <i>ihl</i> : -001/3
(4) $\bar{h}k\bar{l}$: -001/2	(5) $\bar{k}i\bar{l}$: -001/6	(6) $\bar{i}h\bar{l}$: -005/6
(7) $\bar{k}h\bar{l}$: -002/3	(8) $\bar{h}\bar{i}l$:	(9) $\bar{i}k\bar{l}$: -001/3
(10) $\bar{k}h\bar{l}$: -001/6	(11) $\bar{h}\bar{i}l$: -001/2	(12) $\bar{i}k\bar{l}$: -005/6
<i>P</i> 6 ₂ 22 No. 180 (250)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -002/3	(3) <i>ihl</i> : -001/3
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$: -002/3	(6) $\bar{i}h\bar{l}$: -001/3
(7) $\bar{k}h\bar{l}$: -002/3	(8) $\bar{h}\bar{i}l$:	(9) $\bar{i}k\bar{l}$: -001/3
(10) $\bar{k}h\bar{l}$: -002/3	(11) $\bar{h}\bar{i}l$:	(12) $\bar{i}k\bar{l}$: -001/3
<i>P</i> 6 ₂ 22 No. 181 (251)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -001/3	(3) <i>ihl</i> : -002/3
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$: -001/3	(6) $\bar{i}h\bar{l}$: -002/3
(7) $\bar{k}h\bar{l}$: -001/3	(8) $\bar{h}\bar{i}l$:	(9) $\bar{i}k\bar{l}$: -002/3
(10) $\bar{k}h\bar{l}$: -001/3	(11) $\bar{h}\bar{i}l$:	(12) $\bar{i}k\bar{l}$: -002/3

Point group: 6 Hexagonal Laue group: <i>6/m</i>		
<i>P</i> 6 No. 168 (238)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} :	(3) <i>ihl</i> :
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$:	(6) $\bar{i}h\bar{l}$:
<i>P</i> 6 ₁ No. 169 (239)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -001/3	(3) <i>ihl</i> : -002/3
(4) $\bar{h}k\bar{l}$: -001/2	(5) $\bar{k}i\bar{l}$: -005/6	(6) $\bar{i}h\bar{l}$: -001/6
<i>P</i> 6 ₅ No. 170 (240)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -002/3	(3) <i>ihl</i> : -001/3
(4) $\bar{h}k\bar{l}$: -001/2	(5) $\bar{k}i\bar{l}$: -001/6	(6) $\bar{i}h\bar{l}$: -005/6
<i>P</i> 6 ₂ No. 171 (241)		
(1) <i>hkl</i> :	(2) <i>ki</i> \bar{l} : -002/3	(3) <i>ihl</i> : -001/3
(4) $\bar{h}k\bar{l}$:	(5) $\bar{k}i\bar{l}$: -002/3	(6) $\bar{i}h\bar{l}$: -001/3

1. GENERAL RELATIONSHIPS AND TECHNIQUES

Table A1.4.4.1 (cont.)

<i>P</i> _{6₃} 22 No. 182 (252)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) \overline{khl} : -001/2	(11) $\overline{h\bar{i}l}$: -001/2	(12) $\overline{ik\bar{l}}$: -001/2

Point group: <i>6mm</i>	Hexagonal	Laue group: <i>6/mmm</i>
<i>P6mm</i> No. 183 (253)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} :	(5) \overline{kil} :	(6) \overline{ihl} :
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) <i>kh\bar{l}</i> :	(11) <i>h\bar{i}l</i> :	(12) <i>ik\bar{l}</i> :
<i>P6cc</i> No. 184 (254)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} :	(5) \overline{kil} :	(6) \overline{ihl} :
(7) $\overline{kh\bar{l}}$: -001/2	(8) $\overline{h\bar{i}l}$: -001/2	(9) $\overline{ik\bar{l}}$: -001/2
(10) <i>kh\bar{l}</i> : -001/2	(11) <i>h\bar{i}l</i> : -001/2	(12) <i>ik\bar{l}</i> : -001/2
<i>P6₃cm</i> No. 185 (255)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$: -001/2	(8) $\overline{h\bar{i}l}$: -001/2	(9) $\overline{ik\bar{l}}$: -001/2
(10) <i>kh\bar{l}</i> :	(11) <i>h\bar{i}l</i> :	(12) <i>ik\bar{l}</i> :
<i>P6₃mc</i> No. 186 (256)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) <i>kh\bar{l}</i> : -001/2	(11) <i>h\bar{i}l</i> : -001/2	(12) <i>ik\bar{l}</i> : -001/2

Point group: $\overline{6}m2$	Hexagonal	Laue group: <i>6/mmm</i>
$\overline{P6}m2$ No. 187 (257)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} :	(5) \overline{kil} :	(6) \overline{ihl} :
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) \overline{khl} :	(11) $\overline{h\bar{i}l}$:	(12) $\overline{ik\bar{l}}$:
$\overline{P6}c2$ No. 188 (258)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$: -001/2	(8) $\overline{h\bar{i}l}$: -001/2	(9) $\overline{ik\bar{l}}$: -001/2
(10) \overline{khl} :	(11) $\overline{h\bar{i}l}$:	(12) $\overline{ik\bar{l}}$:
$\overline{P6}2m$ No. 189 (259)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} :	(5) \overline{kil} :	(6) \overline{ihl} :
(7) <i>kh\bar{l}</i> :	(8) <i>h\bar{i}l</i> :	(9) <i>ik\bar{l}</i> :
(10) <i>kh\bar{l}</i> :	(11) <i>h\bar{i}l</i> :	(12) <i>ik\bar{l}</i> :
$\overline{P6}2c$ No. 190 (260)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) <i>kh\bar{l}</i> : -001/2	(11) $\overline{h\bar{i}l}$: -001/2	(12) <i>ik\bar{l}</i> : -001/2

Point group: <i>6/mmm</i>	Hexagonal	Laue group: <i>6/mmm</i>
<i>P6/mmm</i> No. 191 (261)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} :	(5) \overline{kil} :	(6) \overline{ihl} :
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) \overline{khl} :	(11) $\overline{h\bar{i}l}$:	(12) $\overline{ik\bar{l}}$:
<i>P6/mcc</i> No. 192 (262)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} :	(5) \overline{kil} :	(6) \overline{ihl} :
(7) $\overline{kh\bar{l}}$: -001/2	(8) $\overline{h\bar{i}l}$: -001/2	(9) $\overline{ik\bar{l}}$: -001/2
(10) \overline{khl} : -001/2	(11) $\overline{h\bar{i}l}$: -001/2	(12) $\overline{ik\bar{l}}$: -001/2
<i>P6₃/mcm</i> No. 193 (263)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$: -001/2	(8) $\overline{h\bar{i}l}$: -001/2	(9) $\overline{ik\bar{l}}$: -001/2
(10) \overline{khl} :	(11) $\overline{h\bar{i}l}$:	(12) $\overline{ik\bar{l}}$:
<i>P6₃/mmc</i> No. 194 (264)		
(1) <i>hkl</i> :	(2) <i>kil</i> :	(3) <i>ihl</i> :
(4) \overline{hkl} : -001/2	(5) \overline{kil} : -001/2	(6) \overline{ihl} : -001/2
(7) $\overline{kh\bar{l}}$:	(8) $\overline{h\bar{i}l}$:	(9) $\overline{ik\bar{l}}$:
(10) \overline{khl} : -001/2	(11) $\overline{h\bar{i}l}$: -001/2	(12) $\overline{ik\bar{l}}$: -001/2

Point group: <i>23</i>	Cubic	Laue group: $\overline{m3}$
<i>P23</i> No. 195 (265)		
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) \overline{hkl} :
(4) \overline{hkl} :	(5) <i>klh</i> :	(6) \overline{klh} :
(7) \overline{klh} :	(8) <i>lkh</i> :	(9) \overline{lkh} :
(10) \overline{lkh} :	(11) \overline{hkl} :	(12) \overline{hkl} :
<i>F23</i> No. 196 (266)		
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) \overline{hkl} :
(4) \overline{hkl} :	(5) <i>klh</i> :	(6) \overline{klh} :
(7) \overline{klh} :	(8) <i>lkh</i> :	(9) \overline{lkh} :
(10) \overline{lkh} :	(11) \overline{hkl} :	(12) \overline{hkl} :
<i>I23</i> No. 197 (267)		
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) \overline{hkl} :
(4) \overline{hkl} :	(5) <i>klh</i> :	(6) \overline{klh} :
(7) \overline{klh} :	(8) <i>lkh</i> :	(9) \overline{lkh} :
(10) \overline{lkh} :	(11) \overline{hkl} :	(12) \overline{hkl} :
<i>P2₁3</i> No. 198 (268)		
(1) <i>hkl</i> :	(2) \overline{hkl} : -011/2	(3) \overline{hkl} : -011/2
(4) \overline{hkl} : -110/2	(5) <i>klh</i> :	(6) \overline{klh} : -110/2
(7) \overline{klh} : -101/2	(8) <i>lkh</i> :	(9) \overline{lkh} : -101/2
(10) \overline{lkh} : -011/2	(11) \overline{hkl} : -110/2	(12) \overline{hkl} : -101/2
<i>I2₁3</i> No. 199 (269)		
(1) <i>hkl</i> :	(2) \overline{hkl} : -101/2	(3) \overline{hkl} : -011/2
(4) \overline{hkl} : -110/2	(5) <i>klh</i> :	(6) \overline{klh} : -110/2
(7) \overline{klh} : -101/2	(8) <i>lkh</i> :	(9) \overline{lkh} : -101/2
(10) \overline{lkh} : -011/2	(11) \overline{hkl} : -110/2	(12) \overline{hkl} : -101/2

Point group: $\overline{m3}$	Cubic	Laue group: $\overline{m3}$
<i>Pm3</i> No. 200 (270)		
(1) <i>hkl</i> :	(2) \overline{hkl} :	(3) \overline{hkl} :
(4) \overline{hkl} :	(5) <i>klh</i> :	(6) \overline{klh} :
(7) \overline{klh} :	(8) <i>lkh</i> :	(9) \overline{lkh} :
(10) \overline{lkh} :	(11) \overline{hkl} :	(12) \overline{hkl} :

1.4. SYMMETRY IN RECIPROCAL SPACE

Table A1.4.4.1 (cont.)

(9) lhk :	(10) $\bar{l}h\bar{k}$: -110/2	(11) $\bar{l}h\bar{k}$: -101/2	(12) $\bar{l}h\bar{k}$: -011/2	(33) $\bar{l}h\bar{k}$: -333/4	(34) $lh\bar{k}$: -113/4	(35) $\bar{l}h\bar{k}$: -131/4	(36) $\bar{l}h\bar{k}$: -311/4
(13) $kh\bar{l}$: -313/4	(14) $\bar{k}h\bar{l}$: -111/4	(15) $\bar{k}h\bar{l}$: -133/4	(16) $\bar{k}h\bar{l}$: -331/4	(37) $\bar{k}h\bar{l}$: -010/2	(38) $kh\bar{l}$: -111/2	(39) $\bar{k}h\bar{l}$: -100/2	(40) $\bar{k}h\bar{l}$: -001/2
(17) $h\bar{l}k$: -313/4	(18) $\bar{h}l\bar{k}$: -331/4	(19) $\bar{h}l\bar{k}$: -111/4	(20) $h\bar{l}k$: -133/4	(41) $\bar{h}l\bar{k}$: -010/2	(42) $h\bar{l}k$: -001/2	(43) $h\bar{l}k$: -111/2	(44) $\bar{h}l\bar{k}$: -100/2
(21) $\bar{l}kh$: -313/4	(22) $\bar{l}k\bar{h}$: -133/4	(23) $lk\bar{h}$: -331/4	(24) $\bar{l}k\bar{h}$: -111/4	(45) $\bar{l}k\bar{h}$: -010/2	(46) $\bar{l}k\bar{h}$: -100/2	(47) $\bar{l}k\bar{h}$: -001/2	(48) $lk\bar{h}$: -111/2
(25) $\bar{h}k\bar{l}$: -111/4	(26) $hk\bar{l}$: -133/4	(27) $h\bar{k}l$: -331/4	(28) $\bar{h}k\bar{l}$: -313/4				
(29) $\bar{k}l\bar{h}$: -111/4	(30) $k\bar{l}h$: -313/4	(31) $k\bar{l}h$: -133/4	(32) $\bar{k}l\bar{h}$: -331/4				
(33) $\bar{l}h\bar{k}$: -111/4	(34) $lh\bar{k}$: -331/4	(35) $\bar{l}h\bar{k}$: -313/4	(36) $\bar{l}h\bar{k}$: -133/4				
(37) $\bar{k}h\bar{l}$: -101/2	(38) $kh\bar{l}$:	(39) $\bar{k}h\bar{l}$: -011/2	(40) $\bar{k}h\bar{l}$: -110/2				
(41) $\bar{h}l\bar{k}$: -101/2	(42) $h\bar{l}k$: -110/2	(43) $h\bar{l}k$:	(44) $\bar{h}l\bar{k}$: -011/2				
(45) $\bar{l}k\bar{h}$: -101/2	(46) $\bar{l}k\bar{h}$: -011/2	(47) $\bar{l}k\bar{h}$: -110/2	(48) $lk\bar{h}$:				
<i>Fd</i> $\bar{3}m$ Origin 2 No. 227 (302)				<i>Fd</i> $\bar{3}c$ Origin 2 No. 228 (304)			
(1) hkl :	(2) $\bar{h}k\bar{l}$: -312/4	(3) $\bar{h}k\bar{l}$: -123/4	(4) $h\bar{k}l$: -231/4	(1) hkl :	(2) $\bar{h}k\bar{l}$: -132/4	(3) $\bar{h}k\bar{l}$: -321/4	(4) $h\bar{k}l$: -213/4
(5) klh :	(6) $\bar{k}l\bar{h}$: -231/4	(7) $\bar{k}l\bar{h}$: -312/4	(8) $k\bar{l}h$: -123/4	(5) klh :	(6) $\bar{k}l\bar{h}$: -213/4	(7) $\bar{k}l\bar{h}$: -132/4	(8) $k\bar{l}h$: -321/4
(9) lhk :	(10) $\bar{l}h\bar{k}$: -123/4	(11) $\bar{l}h\bar{k}$: -231/4	(12) $\bar{l}h\bar{k}$: -312/4	(9) lhk :	(10) $\bar{l}h\bar{k}$: -321/4	(11) $\bar{l}h\bar{k}$: -213/4	(12) $\bar{l}h\bar{k}$: -132/4
(13) $kh\bar{l}$: -312/4	(14) $\bar{k}h\bar{l}$:	(15) $\bar{k}h\bar{l}$: -123/4	(16) $\bar{k}h\bar{l}$: -231/4	(13) $kh\bar{l}$: -310/4	(14) $\bar{k}h\bar{l}$: -111/2	(15) $\bar{k}h\bar{l}$: -103/4	(16) $\bar{k}h\bar{l}$: -031/4
(17) $h\bar{l}k$: -312/4	(18) $\bar{h}l\bar{k}$: -231/4	(19) $\bar{h}l\bar{k}$:	(20) $h\bar{l}k$: -123/4	(17) $h\bar{l}k$: -310/4	(18) $\bar{h}l\bar{k}$: -031/4	(19) $\bar{h}l\bar{k}$: -111/2	(20) $h\bar{l}k$: -103/4
(21) $\bar{l}kh$: -312/4	(22) $\bar{l}k\bar{h}$: -123/4	(23) $lk\bar{h}$: -231/4	(24) $\bar{l}k\bar{h}$:	(21) $\bar{l}kh$: -310/4	(22) $\bar{l}k\bar{h}$: -103/4	(23) $lk\bar{h}$: -031/4	(24) $\bar{l}k\bar{h}$: -111/2
<i>Fd</i> $\bar{3}c$ Origin 1 No. 228 (303)				<i>Im</i> $\bar{3}m$ No. 229 (305)			
(1) hkl :	(2) $\bar{h}k\bar{l}$: -011/2	(3) $\bar{h}k\bar{l}$: -110/2	(4) $h\bar{k}l$: -101/2	(1) hkl :	(2) $\bar{h}k\bar{l}$:	(3) $\bar{h}k\bar{l}$:	(4) $h\bar{k}l$:
(5) klh :	(6) $\bar{k}l\bar{h}$: -101/2	(7) $\bar{k}l\bar{h}$: -011/2	(8) $k\bar{l}h$: -110/2	(5) klh :	(6) $\bar{k}l\bar{h}$:	(7) $\bar{k}l\bar{h}$:	(8) $k\bar{l}h$:
(9) lhk :	(10) $\bar{l}h\bar{k}$: -110/2	(11) $\bar{l}h\bar{k}$: -101/2	(12) $\bar{l}h\bar{k}$: -011/2	(9) lhk :	(10) $\bar{l}h\bar{k}$:	(11) $\bar{l}h\bar{k}$:	(12) $\bar{l}h\bar{k}$:
(13) $kh\bar{l}$: -313/4	(14) $\bar{k}h\bar{l}$: -111/4	(15) $\bar{k}h\bar{l}$: -133/4	(16) $\bar{k}h\bar{l}$: -331/4	(13) $kh\bar{l}$:	(14) $\bar{k}h\bar{l}$:	(15) $\bar{k}h\bar{l}$:	(16) $\bar{k}h\bar{l}$:
(17) $h\bar{l}k$: -313/4	(18) $\bar{h}l\bar{k}$: -331/4	(19) $\bar{h}l\bar{k}$: -111/4	(20) $h\bar{l}k$: -133/4	(17) $h\bar{l}k$:	(18) $\bar{h}l\bar{k}$:	(19) $\bar{h}l\bar{k}$:	(20) $h\bar{l}k$:
(21) $\bar{l}kh$: -313/4	(22) $\bar{l}k\bar{h}$: -133/4	(23) $lk\bar{h}$: -331/4	(24) $\bar{l}k\bar{h}$: -111/4	(21) $\bar{l}kh$:	(22) $\bar{l}k\bar{h}$:	(23) $lk\bar{h}$:	(24) $\bar{l}k\bar{h}$:
(25) $\bar{h}k\bar{l}$: -333/4	(26) $hk\bar{l}$: -311/4	(27) $h\bar{k}l$: -113/4	(28) $\bar{h}k\bar{l}$: -131/4	<i>Ia</i> $\bar{3}d$ No. 230 (306)			
(29) $\bar{k}l\bar{h}$: -333/4	(30) $k\bar{l}h$: -131/4	(31) $k\bar{l}h$: -311/4	(32) $\bar{k}l\bar{h}$: -113/4	(1) hkl :	(2) $\bar{h}k\bar{l}$: -101/2	(3) $\bar{h}k\bar{l}$: -011/2	(4) $h\bar{k}l$: -110/2
				(5) klh :	(6) $\bar{k}l\bar{h}$: -110/2	(7) $\bar{k}l\bar{h}$: -101/2	(8) $k\bar{l}h$: -011/2
				(9) lhk :	(10) $\bar{l}h\bar{k}$: -011/2	(11) $\bar{l}h\bar{k}$: -110/2	(12) $\bar{l}h\bar{k}$: -101/2
				(13) $kh\bar{l}$: -311/4	(14) $\bar{k}h\bar{l}$: -333/4	(15) $\bar{k}h\bar{l}$: -113/4	(16) $\bar{k}h\bar{l}$: -131/4
				(17) $h\bar{l}k$: -311/4	(18) $\bar{h}l\bar{k}$: -131/4	(19) $\bar{h}l\bar{k}$: -333/4	(20) $h\bar{l}k$: -113/4
				(21) $\bar{l}kh$: -311/4	(22) $\bar{l}k\bar{h}$: -113/4	(23) $lk\bar{h}$: -131/4	(24) $\bar{l}k\bar{h}$: -333/4