

MSG No. 132.451 $P4_2'/mcm'$ [Type III, tetragonal]

Table 1: Wyckoff site: 2a, site symmetry: $m.m'm'$

No.	position	mapping
1	$[0, 0, 0]$	$[1, 4, 5, 8, 11, 12, 15, 16]$
2	$[0, 0, \frac{1}{2}]$	$[2, 3, 6, 7, 9, 10, 13, 14]$

Table 2: Wyckoff site: 2b, site symmetry: $-4'2m'$

No.	position	mapping
1	$[0, 0, \frac{1}{4}]$	$[1, 2, 3, 4, 13, 14, 15, 16]$
2	$[0, 0, \frac{3}{4}]$	$[5, 6, 7, 8, 9, 10, 11, 12]$

Table 3: Wyckoff site: 2c, site symmetry: $m.m'm'$

No.	position	mapping
1	$[\frac{1}{2}, \frac{1}{2}, 0]$	$[1, 4, 5, 8, 11, 12, 15, 16]$
2	$[\frac{1}{2}, \frac{1}{2}, \frac{1}{2}]$	$[2, 3, 6, 7, 9, 10, 13, 14]$

Table 4: Wyckoff site: 2d, site symmetry: $-4'2m'$

No.	position	mapping
1	$[\frac{1}{2}, \frac{1}{2}, \frac{1}{4}]$	$[1, 2, 3, 4, 13, 14, 15, 16]$
2	$[\frac{1}{2}, \frac{1}{2}, \frac{3}{4}]$	$[5, 6, 7, 8, 9, 10, 11, 12]$

Table 5: Wyckoff site: 4e, site symmetry: $222.$

No.	position	mapping
1	$[0, \frac{1}{2}, \frac{1}{4}]$	$[1, 2, 3, 4]$
2	$[0, \frac{1}{2}, \frac{3}{4}]$	$[5, 6, 7, 8]$
3	$[\frac{1}{2}, 0, \frac{3}{4}]$	$[9, 10, 11, 12]$
4	$[\frac{1}{2}, 0, \frac{1}{4}]$	$[13, 14, 15, 16]$

Table 6: Wyckoff site: $4f$, site symmetry: $2/m..$

No.	position	mapping
1	$[0, \frac{1}{2}, 0]$	$[1, 4, 5, 8]$
2	$[0, \frac{1}{2}, \frac{1}{2}]$	$[2, 3, 6, 7]$
3	$[\frac{1}{2}, 0, \frac{1}{2}]$	$[9, 10, 13, 14]$
4	$[\frac{1}{2}, 0, 0]$	$[11, 12, 15, 16]$

Table 7: Wyckoff site: $4g$, site symmetry: $2.m'm'$

No.	position	mapping
1	$[0, 0, z]$	$[1, 4, 15, 16]$
2	$[0, 0, \frac{1}{2} - z]$	$[2, 3, 13, 14]$
3	$[0, 0, -z]$	$[5, 8, 11, 12]$
4	$[0, 0, z + \frac{1}{2}]$	$[6, 7, 9, 10]$

Table 8: Wyckoff site: $4h$, site symmetry: $2.m'm'$

No.	position	mapping
1	$[\frac{1}{2}, \frac{1}{2}, z]$	$[1, 4, 15, 16]$
2	$[\frac{1}{2}, \frac{1}{2}, \frac{1}{2} - z]$	$[2, 3, 13, 14]$
3	$[\frac{1}{2}, \frac{1}{2}, -z]$	$[5, 8, 11, 12]$
4	$[\frac{1}{2}, \frac{1}{2}, z + \frac{1}{2}]$	$[6, 7, 9, 10]$

Table 9: Wyckoff site: $4i$, site symmetry: $m.2'm'$

No.	position	mapping
1	$[x, x, 0]$	$[1, 8, 11, 16]$
2	$[x, -x, \frac{1}{2}]$	$[2, 7, 10, 13]$
3	$[-x, x, \frac{1}{2}]$	$[3, 6, 9, 14]$
4	$[-x, -x, 0]$	$[4, 5, 12, 15]$

Table 10: Wyckoff site: $4j$, site symmetry: $m.2'm'$

No.	position	mapping
1	$[x, x, \frac{1}{2}]$	$[1, 8, 11, 16]$
2	$[x, -x, 0]$	$[2, 7, 10, 13]$
3	$[-x, x, 0]$	$[3, 6, 9, 14]$
4	$[-x, -x, \frac{1}{2}]$	$[4, 5, 12, 15]$

Table 11: Wyckoff site: $8k$, site symmetry: $2..$

No.	position	mapping
1	$[0, \frac{1}{2}, z]$	$[1, 4]$
2	$[0, \frac{1}{2}, \frac{1}{2} - z]$	$[2, 3]$
3	$[0, \frac{1}{2}, -z]$	$[5, 8]$
4	$[0, \frac{1}{2}, z + \frac{1}{2}]$	$[6, 7]$
5	$[\frac{1}{2}, 0, z + \frac{1}{2}]$	$[9, 10]$
6	$[\frac{1}{2}, 0, -z]$	$[11, 12]$
7	$[\frac{1}{2}, 0, \frac{1}{2} - z]$	$[13, 14]$
8	$[\frac{1}{2}, 0, z]$	$[15, 16]$

Table 12: Wyckoff site: $8l$, site symmetry: $.2.$

No.	position	mapping
1	$[x, 0, \frac{1}{4}]$	$[1, 2]$
2	$[-x, 0, \frac{1}{4}]$	$[3, 4]$
3	$[-x, 0, \frac{3}{4}]$	$[5, 6]$
4	$[x, 0, \frac{3}{4}]$	$[7, 8]$
5	$[0, x, \frac{3}{4}]$	$[9, 11]$
6	$[0, -x, \frac{3}{4}]$	$[10, 12]$
7	$[0, -x, \frac{1}{4}]$	$[13, 15]$
8	$[0, x, \frac{1}{4}]$	$[14, 16]$

Table 13: Wyckoff site: $8m$, site symmetry: $.2.$

No.	position	mapping
1	$[x, \frac{1}{2}, \frac{1}{4}]$	$[1, 2]$
2	$[-x, \frac{1}{2}, \frac{1}{4}]$	$[3, 4]$
3	$[-x, \frac{1}{2}, \frac{3}{4}]$	$[5, 6]$
4	$[x, \frac{1}{2}, \frac{3}{4}]$	$[7, 8]$
5	$[\frac{1}{2}, x, \frac{3}{4}]$	$[9, 11]$
6	$[\frac{1}{2}, -x, \frac{3}{4}]$	$[10, 12]$
7	$[\frac{1}{2}, -x, \frac{1}{4}]$	$[13, 15]$
8	$[\frac{1}{2}, x, \frac{1}{4}]$	$[14, 16]$

Table 14: Wyckoff site: $8n$, site symmetry: $m..$

No.	position	mapping
1	$[x, y, 0]$	$[1, 8]$
2	$[x, -y, \frac{1}{2}]$	$[2, 7]$
3	$[-x, y, \frac{1}{2}]$	$[3, 6]$

continued ...

Table 14

No.	position	mapping
4	$[-x, -y, 0]$	[4,5]
5	$[-y, x, \frac{1}{2}]$	[9,14]
6	$[y, -x, \frac{1}{2}]$	[10,13]
7	$[y, x, 0]$	[11,16]
8	$[-y, -x, 0]$	[12,15]

Table 15: Wyckoff site: 8o, site symmetry: $\bar{3}m'$

No.	position	mapping
1	$[x, x, z]$	[1,16]
2	$[x, -x, \frac{1}{2} - z]$	[2,13]
3	$[-x, x, \frac{1}{2} - z]$	[3,14]
4	$[-x, -x, z]$	[4,15]
5	$[-x, -x, -z]$	[5,12]
6	$[-x, x, z + \frac{1}{2}]$	[6,9]
7	$[x, -x, z + \frac{1}{2}]$	[7,10]
8	$[x, x, -z]$	[8,11]

Table 16: Wyckoff site: 16p, site symmetry: 1

No.	position	mapping
1	$[x, y, z]$	[1]
2	$[x, -y, \frac{1}{2} - z]$	[2]
3	$[-x, y, \frac{1}{2} - z]$	[3]
4	$[-x, -y, z]$	[4]
5	$[-x, -y, -z]$	[5]
6	$[-x, y, z + \frac{1}{2}]$	[6]
7	$[x, -y, z + \frac{1}{2}]$	[7]
8	$[x, y, -z]$	[8]
9	$[-y, x, z + \frac{1}{2}]$	[9]
10	$[y, -x, z + \frac{1}{2}]$	[10]
11	$[y, x, -z]$	[11]
12	$[-y, -x, -z]$	[12]
13	$[y, -x, \frac{1}{2} - z]$	[13]
14	$[-y, x, \frac{1}{2} - z]$	[14]
15	$[-y, -x, z]$	[15]
16	$[y, x, z]$	[16]