

MSG No. 220.89  $I\bar{4}3d$  [ Type I, cubic ]

Table 1: Wyckoff site: 12a, site symmetry:  $-4..$

No.	position	mapping
1	$[\frac{3}{8}, 0, \frac{1}{4}]$	[1,2,14,37]
2	$[\frac{1}{8}, 0, \frac{3}{4}]$	[3,28,45,46]
3	$[\frac{5}{8}, \frac{1}{2}, \frac{1}{4}]$	[4,21,22,27]
4	$[\frac{1}{4}, \frac{3}{8}, 0]$	[5,12,17,43]
5	$[0, \frac{1}{4}, \frac{3}{8}]$	[6,9,23,40]
6	$[\frac{1}{2}, \frac{1}{4}, \frac{5}{8}]$	[7,15,24,35]
7	$[\frac{3}{4}, \frac{1}{8}, 0]$	[8,34,42,44]
8	$[\frac{1}{4}, \frac{5}{8}, \frac{1}{2}]$	[10,18,20,32]
9	$[0, \frac{3}{4}, \frac{1}{8}]$	[11,31,39,48]
10	$[\frac{7}{8}, \frac{1}{2}, \frac{3}{4}]$	[13,25,26,38]
11	$[\frac{1}{2}, \frac{3}{4}, \frac{7}{8}]$	[16,30,33,47]
12	$[\frac{3}{4}, \frac{7}{8}, \frac{1}{2}]$	[19,29,36,41]

Table 2: Wyckoff site: 12b, site symmetry:  $-4..$

No.	position	mapping
1	$[\frac{7}{8}, 0, \frac{1}{4}]$	[1,2,14,37]
2	$[\frac{5}{8}, 0, \frac{3}{4}]$	[3,28,45,46]
3	$[\frac{1}{8}, \frac{1}{2}, \frac{1}{4}]$	[4,21,22,27]
4	$[\frac{1}{4}, \frac{7}{8}, 0]$	[5,12,17,43]
5	$[0, \frac{1}{4}, \frac{7}{8}]$	[6,9,23,40]
6	$[\frac{1}{2}, \frac{1}{4}, \frac{1}{8}]$	[7,15,24,35]
7	$[\frac{3}{4}, \frac{5}{8}, 0]$	[8,34,42,44]
8	$[\frac{1}{4}, \frac{1}{8}, \frac{1}{2}]$	[10,18,20,32]
9	$[0, \frac{3}{4}, \frac{5}{8}]$	[11,31,39,48]
10	$[\frac{3}{8}, \frac{1}{2}, \frac{3}{4}]$	[13,25,26,38]
11	$[\frac{1}{2}, \frac{3}{4}, \frac{3}{8}]$	[16,30,33,47]
12	$[\frac{3}{4}, \frac{3}{8}, \frac{1}{2}]$	[19,29,36,41]

Table 3: Wyckoff site: 16c, site symmetry:  $.3.$

No.	position	mapping
1	$[x, x, x]$	[1,5,6]
2	$[x, -x, \frac{1}{2} - x]$	[2,10,11]
3	$[\frac{1}{2} - x, x, -x]$	[3,7,12]
4	$[-x, \frac{1}{2} - x, x]$	[4,8,9]
5	$[\frac{1}{4} - x, x + \frac{1}{4}, \frac{3}{4} - x]$	[13,18,23]
6	$[\frac{3}{4} - x, \frac{1}{4} - x, x + \frac{1}{4}]$	[14,15,19]
7	$[x + \frac{1}{4}, \frac{3}{4} - x, \frac{1}{4} - x]$	[16,17,21]

*continued ...*

Table 3

No.	position	mapping
8	$[x + \frac{1}{4}, x + \frac{1}{4}, x + \frac{1}{4}]$	[20, 22, 24]
9	$[x + \frac{1}{2}, x + \frac{1}{2}, x + \frac{1}{2}]$	[25, 29, 30]
10	$[x + \frac{1}{2}, \frac{1}{2} - x, -x]$	[26, 34, 35]
11	$[-x, x + \frac{1}{2}, \frac{1}{2} - x]$	[27, 31, 36]
12	$[\frac{1}{2} - x, -x, x + \frac{1}{2}]$	[28, 32, 33]
13	$[\frac{3}{4} - x, x + \frac{3}{4}, \frac{1}{4} - x]$	[37, 42, 47]
14	$[\frac{1}{4} - x, \frac{3}{4} - x, x + \frac{3}{4}]$	[38, 39, 43]
15	$[x + \frac{3}{4}, \frac{1}{4} - x, \frac{3}{4} - x]$	[40, 41, 45]
16	$[x + \frac{3}{4}, x + \frac{3}{4}, x + \frac{3}{4}]$	[44, 46, 48]

Table 4: Wyckoff site: 24d, site symmetry: 2..

No.	position	mapping
1	$[x, 0, \frac{1}{4}]$	[1, 2]
2	$[\frac{1}{2} - x, 0, \frac{3}{4}]$	[3, 28]
3	$[-x, \frac{1}{2}, \frac{1}{4}]$	[4, 27]
4	$[\frac{1}{4}, x, 0]$	[5, 12]
5	$[0, \frac{1}{4}, x]$	[6, 9]
6	$[\frac{1}{2}, \frac{1}{4}, -x]$	[7, 35]
7	$[\frac{3}{4}, \frac{1}{2} - x, 0]$	[8, 34]
8	$[\frac{1}{4}, -x, \frac{1}{2}]$	[10, 32]
9	$[0, \frac{3}{4}, \frac{1}{2} - x]$	[11, 31]
10	$[\frac{1}{4} - x, \frac{1}{2}, \frac{3}{4}]$	[13, 38]
11	$[\frac{3}{4} - x, 0, \frac{1}{4}]$	[14, 37]
12	$[\frac{1}{2}, \frac{1}{4}, x + \frac{1}{4}]$	[15, 24]
13	$[\frac{1}{2}, \frac{3}{4}, \frac{1}{4} - x]$	[16, 47]
14	$[\frac{1}{4}, \frac{3}{4} - x, 0]$	[17, 43]
15	$[\frac{1}{4}, x + \frac{1}{4}, \frac{1}{2}]$	[18, 20]
16	$[\frac{3}{4}, \frac{1}{4} - x, \frac{1}{2}]$	[19, 41]
17	$[x + \frac{1}{4}, \frac{1}{2}, \frac{1}{4}]$	[21, 22]
18	$[0, \frac{1}{4}, \frac{3}{4} - x]$	[23, 40]
19	$[x + \frac{1}{2}, \frac{1}{2}, \frac{3}{4}]$	[25, 26]
20	$[\frac{3}{4}, x + \frac{1}{2}, \frac{1}{2}]$	[29, 36]
21	$[\frac{1}{2}, \frac{3}{4}, x + \frac{1}{2}]$	[30, 33]
22	$[0, \frac{3}{4}, x + \frac{3}{4}]$	[39, 48]
23	$[\frac{3}{4}, x + \frac{3}{4}, 0]$	[42, 44]
24	$[x + \frac{3}{4}, 0, \frac{3}{4}]$	[45, 46]

Table 5: Wyckoff site: **48e**, site symmetry: 1

No.	position	mapping
1	$[x, y, z]$	[1]
2	$[x, -y, \frac{1}{2} - z]$	[2]
3	$[\frac{1}{2} - x, y, -z]$	[3]
4	$[-x, \frac{1}{2} - y, z]$	[4]
5	$[z, x, y]$	[5]
6	$[y, z, x]$	[6]
7	$[\frac{1}{2} - y, z, -x]$	[7]
8	$[-z, \frac{1}{2} - x, y]$	[8]
9	$[-y, \frac{1}{2} - z, x]$	[9]
10	$[z, -x, \frac{1}{2} - y]$	[10]
11	$[y, -z, \frac{1}{2} - x]$	[11]
12	$[\frac{1}{2} - z, x, -y]$	[12]
13	$[\frac{1}{4} - x, z + \frac{1}{4}, \frac{3}{4} - y]$	[13]
14	$[\frac{3}{4} - x, \frac{1}{4} - z, y + \frac{1}{4}]$	[14]
15	$[\frac{3}{4} - z, \frac{1}{4} - y, x + \frac{1}{4}]$	[15]
16	$[z + \frac{1}{4}, \frac{3}{4} - y, \frac{1}{4} - x]$	[16]
17	$[y + \frac{1}{4}, \frac{3}{4} - x, \frac{1}{4} - z]$	[17]
18	$[\frac{1}{4} - y, x + \frac{1}{4}, \frac{3}{4} - z]$	[18]
19	$[\frac{3}{4} - y, \frac{1}{4} - x, z + \frac{1}{4}]$	[19]
20	$[y + \frac{1}{4}, x + \frac{1}{4}, z + \frac{1}{4}]$	[20]
21	$[x + \frac{1}{4}, \frac{3}{4} - z, \frac{1}{4} - y]$	[21]
22	$[x + \frac{1}{4}, z + \frac{1}{4}, y + \frac{1}{4}]$	[22]
23	$[\frac{1}{4} - z, y + \frac{1}{4}, \frac{3}{4} - x]$	[23]
24	$[z + \frac{1}{4}, y + \frac{1}{4}, x + \frac{1}{4}]$	[24]
25	$[x + \frac{1}{2}, y + \frac{1}{2}, z + \frac{1}{2}]$	[25]
26	$[x + \frac{1}{2}, \frac{1}{2} - y, -z]$	[26]
27	$[-x, y + \frac{1}{2}, \frac{1}{2} - z]$	[27]
28	$[\frac{1}{2} - x, -y, z + \frac{1}{2}]$	[28]
29	$[z + \frac{1}{2}, x + \frac{1}{2}, y + \frac{1}{2}]$	[29]
30	$[y + \frac{1}{2}, z + \frac{1}{2}, x + \frac{1}{2}]$	[30]
31	$[-y, z + \frac{1}{2}, \frac{1}{2} - x]$	[31]
32	$[\frac{1}{2} - z, -x, y + \frac{1}{2}]$	[32]
33	$[\frac{1}{2} - y, -z, x + \frac{1}{2}]$	[33]
34	$[z + \frac{1}{2}, \frac{1}{2} - x, -y]$	[34]
35	$[y + \frac{1}{2}, \frac{1}{2} - z, -x]$	[35]
36	$[-z, x + \frac{1}{2}, \frac{1}{2} - y]$	[36]
37	$[\frac{3}{4} - x, z + \frac{3}{4}, \frac{1}{4} - y]$	[37]
38	$[\frac{1}{4} - x, \frac{3}{4} - z, y + \frac{3}{4}]$	[38]
39	$[\frac{1}{4} - z, \frac{3}{4} - y, x + \frac{3}{4}]$	[39]
40	$[z + \frac{3}{4}, \frac{1}{4} - y, \frac{3}{4} - x]$	[40]
41	$[y + \frac{3}{4}, \frac{1}{4} - x, \frac{3}{4} - z]$	[41]
42	$[\frac{3}{4} - y, x + \frac{3}{4}, \frac{1}{4} - z]$	[42]
43	$[\frac{1}{4} - y, \frac{3}{4} - x, z + \frac{3}{4}]$	[43]
44	$[y + \frac{3}{4}, x + \frac{3}{4}, z + \frac{3}{4}]$	[44]
45	$[x + \frac{3}{4}, \frac{1}{4} - z, \frac{3}{4} - y]$	[45]
46	$[x + \frac{3}{4}, z + \frac{3}{4}, y + \frac{3}{4}]$	[46]

*continued ...*

Table 5

No.	position	mapping
47	$[\frac{3}{4} - z, y + \frac{3}{4}, \frac{1}{4} - x]$	[47]
48	$[z + \frac{3}{4}, y + \frac{3}{4}, x + \frac{3}{4}]$	[48]