# SG No. 213 $O^7$ $P4_132$ [ cubic ]

* plus set: $+[0,\ 0,\ 0]$

Table 1: Wyckoff site: `4a`, site symmetry: `.32`

| No. | position | mapping |
|---|---|---|
| 1 | $\left[\frac{3}{8},\ \frac{3}{8},\ \frac{3}{8}\right]$ | `[1,5,9,14,19,24]` |
| 2 | $\left[\frac{1}{8},\ \frac{5}{8},\ \frac{7}{8}\right]$ | `[2,7,12,13,17,21]` |
| 3 | $\left[\frac{5}{8},\ \frac{7}{8},\ \frac{1}{8}\right]$ | `[3,8,10,15,20,22]` |
| 4 | $\left[\frac{7}{8},\ \frac{1}{8},\ \frac{5}{8}\right]$ | `[4,6,11,16,18,23]` |

Table 2: Wyckoff site: `4b`, site symmetry: `.32`

| No. | position | mapping |
|---|---|---|
| 1 | $\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$ | `[1,5,9,14,19,24]` |
| 2 | $\left[\frac{5}{8},\ \frac{1}{8},\ \frac{3}{8}\right]$ | `[2,7,12,13,17,21]` |
| 3 | $\left[\frac{1}{8},\ \frac{3}{8},\ \frac{5}{8}\right]$ | `[3,8,10,15,20,22]` |
| 4 | $\left[\frac{3}{8},\ \frac{5}{8},\ \frac{1}{8}\right]$ | `[4,6,11,16,18,23]` |

Table 3: Wyckoff site: `8c`, site symmetry: `.3.`

| No. | position | mapping |
|---|---|---|
| 1 | $[x,\ x,\ x]$ | `[1,5,9]` |
| 2 | $\left[\frac{1}{2}-x,\ -x,\ x+\frac{1}{2}\right]$ | `[2,7,12]` |
| 3 | $\left[-x,\ x+\frac{1}{2},\ \frac{1}{2}-x\right]$ | `[3,8,10]` |
| 4 | $\left[x+\frac{1}{2},\ \frac{1}{2}-x,\ -x\right]$ | `[4,6,11]` |
| 5 | $\left[x+\frac{3}{4},\ x+\frac{1}{4},\ \frac{1}{4}-x\right]$ | `[13,17,21]` |
| 6 | $\left[\frac{3}{4}-x,\ \frac{3}{4}-x,\ \frac{3}{4}-x\right]$ | `[14,19,24]` |
| 7 | $\left[x+\frac{1}{4},\ \frac{1}{4}-x,\ x+\frac{3}{4}\right]$ | `[15,20,22]` |
| 8 | $\left[\frac{1}{4}-x,\ x+\frac{3}{4},\ x+\frac{1}{4}\right]$ | `[16,18,23]` |

Table 4: Wyckoff site: `12d`, site symmetry: `..2`

| No. | position | mapping |
|---|---|---|
| 1 | $\left[\frac{1}{8},\ y,\ y+\frac{1}{4}\right]$ | `[1,18]` |
| 2 | $\left[\frac{3}{8},\ -y,\ y+\frac{3}{4}\right]$ | `[2,20]` |
| 3 | $\left[\frac{7}{8},\ y+\frac{1}{2},\ \frac{1}{4}-y\right]$ | `[3,17]` |
| 4 | $\left[\frac{5}{8},\ \frac{1}{2}-y,\ \frac{3}{4}-y\right]$ | `[4,19]` |
| 5 | $\left[y+\frac{1}{4},\ \frac{1}{8},\ y\right]$ | `[5,15]` |
| 6 | $\left[y+\frac{3}{4},\ \frac{3}{8},\ -y\right]$ | `[6,13]` |
| 7 | $\left[\frac{1}{4}-y,\ \frac{7}{8},\ y+\frac{1}{2}\right]$ | `[7,16]` |
| 8 | $\left[\frac{3}{4}-y,\ \frac{5}{8},\ \frac{1}{2}-y\right]$ | `[8,14]` |

*continued ...*

Table 4

| No. | position | mapping |
|---|---|---|
| 9 | $\left[y,\, y+\frac{1}{4},\, \frac{1}{8}\right]$ | [9,21] |
| 10 | $\left[-y,\, y+\frac{3}{4},\, \frac{3}{8}\right]$ | [10,23] |
| 11 | $\left[y+\frac{1}{2},\, \frac{1}{4}-y,\, \frac{7}{8}\right]$ | [11,22] |
| 12 | $\left[\frac{1}{2}-y,\, \frac{3}{4}-y,\, \frac{5}{8}\right]$ | [12,24] |

Table 5: Wyckoff site: 24e, site symmetry: 1

| No. | position | mapping |
|---|---|---|
| 1 | $[x,\, y,\, z]$ | [1] |
| 2 | $\left[\frac{1}{2}-x,\, -y,\, z+\frac{1}{2}\right]$ | [2] |
| 3 | $\left[-x,\, y+\frac{1}{2},\, \frac{1}{2}-z\right]$ | [3] |
| 4 | $\left[x+\frac{1}{2},\, \frac{1}{2}-y,\, -z\right]$ | [4] |
| 5 | $[z,\, x,\, y]$ | [5] |
| 6 | $\left[z+\frac{1}{2},\, \frac{1}{2}-x,\, -y\right]$ | [6] |
| 7 | $\left[\frac{1}{2}-z,\, -x,\, y+\frac{1}{2}\right]$ | [7] |
| 8 | $\left[-z,\, x+\frac{1}{2},\, \frac{1}{2}-y\right]$ | [8] |
| 9 | $[y,\, z,\, x]$ | [9] |
| 10 | $\left[-y,\, z+\frac{1}{2},\, \frac{1}{2}-x\right]$ | [10] |
| 11 | $\left[y+\frac{1}{2},\, \frac{1}{2}-z,\, -x\right]$ | [11] |
| 12 | $\left[\frac{1}{2}-y,\, -z,\, x+\frac{1}{2}\right]$ | [12] |
| 13 | $\left[y+\frac{3}{4},\, x+\frac{1}{4},\, \frac{1}{4}-z\right]$ | [13] |
| 14 | $\left[\frac{3}{4}-y,\, \frac{3}{4}-x,\, \frac{3}{4}-z\right]$ | [14] |
| 15 | $\left[y+\frac{1}{4},\, \frac{1}{4}-x,\, z+\frac{3}{4}\right]$ | [15] |
| 16 | $\left[\frac{1}{4}-y,\, x+\frac{3}{4},\, z+\frac{1}{4}\right]$ | [16] |
| 17 | $\left[x+\frac{3}{4},\, z+\frac{1}{4},\, \frac{1}{4}-y\right]$ | [17] |
| 18 | $\left[\frac{1}{4}-x,\, z+\frac{3}{4},\, y+\frac{1}{4}\right]$ | [18] |
| 19 | $\left[\frac{3}{4}-x,\, \frac{3}{4}-z,\, \frac{3}{4}-y\right]$ | [19] |
| 20 | $\left[x+\frac{1}{4},\, \frac{1}{4}-z,\, y+\frac{3}{4}\right]$ | [20] |
| 21 | $\left[z+\frac{3}{4},\, y+\frac{1}{4},\, \frac{1}{4}-x\right]$ | [21] |
| 22 | $\left[z+\frac{1}{4},\, \frac{1}{4}-y,\, x+\frac{3}{4}\right]$ | [22] |
| 23 | $\left[\frac{1}{4}-z,\, y+\frac{3}{4},\, x+\frac{1}{4}\right]$ | [23] |
| 24 | $\left[\frac{3}{4}-z,\, \frac{3}{4}-y,\, \frac{3}{4}-x\right]$ | [24] |