SG No. 70 D_{2h}^{24} $Fddd$ [orthorhombic]

* plus set: $+[0,\ 0,\ 0]$, $+\left[0,\ \frac{1}{2},\ \frac{1}{2}\right]$, $+\left[\frac{1}{2},\ 0,\ \frac{1}{2}\right]$, $+\left[\frac{1}{2},\ \frac{1}{2},\ 0\right]$
* Wyckoff site: `8a`, site symmetry: `222`

Table 1: Wyckoff bond: `8a@8a`

No.	vector	center	mapping
1	$[0,\ 0,\ Z]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[1,2,-3,-4]`
2	$[0,\ 0,\ -Z]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[5,6,-7,-8]`

Table 2: Wyckoff bond: `8b@8a`

No.	vector	center	mapping
1	$[0,\ Y,\ 0]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[1,-2,3,-4]`
2	$[0,\ -Y,\ 0]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[5,-6,7,-8]`

Table 3: Wyckoff bond: `8c@8a`

No.	vector	center	mapping
1	$[X,\ 0,\ 0]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[1,-2,-3,4]`
2	$[-X,\ 0,\ 0]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[5,-6,-7,8]`

Table 4: Wyckoff bond: `16d@8a`

No.	vector	center	mapping
1	$[X,\ Y,\ 0]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[1,-2]`
2	$[-X,\ Y,\ 0]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[3,-4]`
3	$[-X,\ -Y,\ 0]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[5,-6]`
4	$[X,\ -Y,\ 0]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[7,-8]`

Table 5: Wyckoff bond: `16e@8a`

No.	vector	center	mapping
1	$[X,\ 0,\ Z]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[1,-3]`
2	$[-X,\ 0,\ Z]$	$\left[\frac{1}{8},\ \frac{1}{8},\ \frac{1}{8}\right]$	`[2,-4]`
3	$[-X,\ 0,\ -Z]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[5,-7]`
4	$[X,\ 0,\ -Z]$	$\left[\frac{7}{8},\ \frac{7}{8},\ \frac{7}{8}\right]$	`[6,-8]`

Table 6: Wyckoff bond: `16f@8a`

No.	vector	center	mapping
1	$[0, Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right]$	`[1,-4]`
2	$[0, -Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right]$	`[2,-3]`
3	$[0, -Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{7}{8}\right]$	`[5,-8]`
4	$[0, Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{7}{8}\right]$	`[6,-7]`

Table 7: Wyckoff bond: `32g@8a`

No.	vector	center	mapping
1	$[X, Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right]$	`[1]`
2	$[-X, -Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right]$	`[2]`
3	$[-X, Y, -Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right]$	`[3]`
4	$[X, -Y, -Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{1}{8}\right]$	`[4]`
5	$[-X, -Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{7}{8}\right]$	`[5]`
6	$[X, Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{7}{8}\right]$	`[6]`
7	$[X, -Y, Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{7}{8}\right]$	`[7]`
8	$[-X, Y, Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{7}{8}\right]$	`[8]`

* Wyckoff site: `8b`, site symmetry: `222`

Table 8: Wyckoff bond: `8a@8b`

No.	vector	center	mapping
1	$[0, 0, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1,2,-3,-4]`
2	$[0, 0, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5,6,-7,-8]`

Table 9: Wyckoff bond: `8b@8b`

No.	vector	center	mapping
1	$[0, Y, 0]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1,-2,3,-4]`
2	$[0, -Y, 0]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5,-6,7,-8]`

Table 10: Wyckoff bond: `8c@8b`

No.	vector	center	mapping
1	$[X, 0, 0]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1,-2,-3,4]`
2	$[-X, 0, 0]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5,-6,-7,8]`

Table 11: Wyckoff bond: `16d@8b`

No.	vector	center	mapping
1	$[X, Y, 0]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1,-2]`
2	$[-X, Y, 0]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[3,-4]`
3	$[-X, -Y, 0]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5,-6]`
4	$[X, -Y, 0]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[7,-8]`

Table 12: Wyckoff bond: `16e@8b`

No.	vector	center	mapping
1	$[X, 0, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1,-3]`
2	$[-X, 0, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[2,-4]`
3	$[-X, 0, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5,-7]`
4	$[X, 0, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[6,-8]`

Table 13: Wyckoff bond: `16f@8b`

No.	vector	center	mapping
1	$[0, Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1,-4]`
2	$[0, -Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[2,-3]`
3	$[0, -Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5,-8]`
4	$[0, Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[6,-7]`

Table 14: Wyckoff bond: `32g@8b`

No.	vector	center	mapping
1	$[X, Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[1]`
2	$[-X, -Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[2]`
3	$[-X, Y, -Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[3]`
4	$[X, -Y, -Z]$	$\left[\frac{1}{8}, \frac{1}{8}, \frac{5}{8}\right]$	`[4]`
5	$[-X, -Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[5]`
6	$[X, Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[6]`
7	$[X, -Y, Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[7]`
8	$[-X, Y, Z]$	$\left[\frac{7}{8}, \frac{7}{8}, \frac{3}{8}\right]$	`[8]`

* Wyckoff site: `16c`, site symmetry: `-1`

Table 15: Wyckoff bond: `16a@16c`

No.	vector	center	mapping
1	$[X, Y, Z]$	$[0, 0, 0]$	`[1,-5]`
2	$[-X, -Y, Z]$	$\left[\frac{3}{4}, \frac{3}{4}, 0\right]$	`[2,-6]`
3	$[-X, Y, -Z]$	$\left[\frac{3}{4}, 0, \frac{3}{4}\right]$	`[3,-7]`
4	$[X, -Y, -Z]$	$\left[0, \frac{3}{4}, \frac{3}{4}\right]$	`[4,-8]`

* Wyckoff site: `16d`, site symmetry: `-1`

Table 16: Wyckoff bond: `16a@16d`

No.	vector	center	mapping
1	$[X, Y, Z]$	$\left[\frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right]$	`[1,-5]`
2	$[-X, -Y, Z]$	$\left[\frac{1}{4}, \frac{1}{4}, \frac{1}{2}\right]$	`[2,-6]`
3	$[-X, Y, -Z]$	$\left[\frac{1}{4}, \frac{1}{2}, \frac{1}{4}\right]$	`[3,-7]`
4	$[X, -Y, -Z]$	$\left[\frac{1}{2}, \frac{1}{4}, \frac{1}{4}\right]$	`[4,-8]`

* Wyckoff site: `16e`, site symmetry: `2..`

Table 17: Wyckoff bond: `16a@16e`

No.	vector	center	mapping
1	$[0, Y, Z]$	$\left[x, \frac{1}{8}, \frac{1}{8}\right]$	`[1,-4]`
2	$[0, -Y, Z]$	$\left[\frac{3}{4} - x, \frac{5}{8}, \frac{1}{8}\right]$	`[2,-3]`
3	$[0, -Y, -Z]$	$\left[-x, \frac{7}{8}, \frac{7}{8}\right]$	`[5,-8]`
4	$[0, Y, -Z]$	$\left[x + \frac{1}{4}, \frac{3}{8}, \frac{7}{8}\right]$	`[6,-7]`

Table 18: Wyckoff bond: `16b@16e`

No.	vector	center	mapping
1	$[X, 0, 0]$	$\left[x, \frac{1}{8}, \frac{1}{8}\right]$	`[1,4]`
2	$[-X, 0, 0]$	$\left[\frac{3}{4} - x, \frac{5}{8}, \frac{1}{8}\right]$	`[2,3]`
3	$[-X, 0, 0]$	$\left[-x, \frac{7}{8}, \frac{7}{8}\right]$	`[5,8]`
4	$[X, 0, 0]$	$\left[x + \frac{1}{4}, \frac{3}{8}, \frac{7}{8}\right]$	`[6,7]`

Table 19: Wyckoff bond: `32c@16e`

No.	vector	center	mapping
1	$[X, Y, Z]$	$\left[x, \frac{1}{8}, \frac{1}{8}\right]$	`[1]`
2	$[-X, -Y, Z]$	$\left[\frac{3}{4} - x, \frac{5}{8}, \frac{1}{8}\right]$	`[2]`

continued ...

Table 19

No.	vector	center	mapping
3	$[-X, Y, -Z]$	$\left[\frac{3}{4}-x, \frac{5}{8}, \frac{1}{8}\right]$	`[3]`
4	$[X, -Y, -Z]$	$\left[x, \frac{1}{8}, \frac{1}{8}\right]$	`[4]`
5	$[-X, -Y, -Z]$	$\left[-x, \frac{7}{8}, \frac{7}{8}\right]$	`[5]`
6	$[X, Y, -Z]$	$\left[x+\frac{1}{4}, \frac{3}{8}, \frac{7}{8}\right]$	`[6]`
7	$[X, -Y, Z]$	$\left[x+\frac{1}{4}, \frac{3}{8}, \frac{7}{8}\right]$	`[7]`
8	$[-X, Y, Z]$	$\left[-x, \frac{7}{8}, \frac{7}{8}\right]$	`[8]`

* Wyckoff site: `16f`, site symmetry: `.2.`

Table 20: Wyckoff bond: `16a@16f`

No.	vector	center	mapping
1	$[X, 0, Z]$	$\left[\frac{1}{8}, y, \frac{1}{8}\right]$	`[1,-3]`
2	$[-X, 0, Z]$	$\left[\frac{5}{8}, \frac{3}{4}-y, \frac{1}{8}\right]$	`[2,-4]`
3	$[-X, 0, -Z]$	$\left[\frac{7}{8}, -y, \frac{7}{8}\right]$	`[5,-7]`
4	$[X, 0, -Z]$	$\left[\frac{3}{8}, y+\frac{1}{4}, \frac{7}{8}\right]$	`[6,-8]`

Table 21: Wyckoff bond: `16b@16f`

No.	vector	center	mapping
1	$[0, Y, 0]$	$\left[\frac{1}{8}, y, \frac{1}{8}\right]$	`[1,3]`
2	$[0, -Y, 0]$	$\left[\frac{5}{8}, \frac{3}{4}-y, \frac{1}{8}\right]$	`[2,4]`
3	$[0, -Y, 0]$	$\left[\frac{7}{8}, -y, \frac{7}{8}\right]$	`[5,7]`
4	$[0, Y, 0]$	$\left[\frac{3}{8}, y+\frac{1}{4}, \frac{7}{8}\right]$	`[6,8]`

Table 22: Wyckoff bond: `32c@16f`

No.	vector	center	mapping
1	$[X, Y, Z]$	$\left[\frac{1}{8}, y, \frac{1}{8}\right]$	`[1]`
2	$[-X, -Y, Z]$	$\left[\frac{5}{8}, \frac{3}{4}-y, \frac{1}{8}\right]$	`[2]`
3	$[-X, Y, -Z]$	$\left[\frac{1}{8}, y, \frac{1}{8}\right]$	`[3]`
4	$[X, -Y, -Z]$	$\left[\frac{5}{8}, \frac{3}{4}-y, \frac{1}{8}\right]$	`[4]`
5	$[-X, -Y, -Z]$	$\left[\frac{7}{8}, -y, \frac{7}{8}\right]$	`[5]`
6	$[X, Y, -Z]$	$\left[\frac{3}{8}, y+\frac{1}{4}, \frac{7}{8}\right]$	`[6]`
7	$[X, -Y, Z]$	$\left[\frac{7}{8}, -y, \frac{7}{8}\right]$	`[7]`
8	$[-X, Y, Z]$	$\left[\frac{3}{8}, y+\frac{1}{4}, \frac{7}{8}\right]$	`[8]`

* Wyckoff site: `16g`, site symmetry: `..2`

Table 23: Wyckoff bond: `16a@16g`

No.	vector	center	mapping
1	$[X, Y, 0]$	$\left[\frac{1}{8}, \frac{1}{8}, z\right]$	`[1,-2]`
2	$[-X, Y, 0]$	$\left[\frac{5}{8}, \frac{1}{8}, \frac{3}{4} - z\right]$	`[3,-4]`
3	$[-X, -Y, 0]$	$\left[\frac{7}{8}, \frac{7}{8}, -z\right]$	`[5,-6]`
4	$[X, -Y, 0]$	$\left[\frac{3}{8}, \frac{7}{8}, z + \frac{1}{4}\right]$	`[7,-8]`

Table 24: Wyckoff bond: `16b@16g`

No.	vector	center	mapping
1	$[0, 0, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, z\right]$	`[1,2]`
2	$[0, 0, -Z]$	$\left[\frac{5}{8}, \frac{1}{8}, \frac{3}{4} - z\right]$	`[3,4]`
3	$[0, 0, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, -z\right]$	`[5,6]`
4	$[0, 0, Z]$	$\left[\frac{3}{8}, \frac{7}{8}, z + \frac{1}{4}\right]$	`[7,8]`

Table 25: Wyckoff bond: `32c@16g`

No.	vector	center	mapping
1	$[X, Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, z\right]$	`[1]`
2	$[-X, -Y, Z]$	$\left[\frac{1}{8}, \frac{1}{8}, z\right]$	`[2]`
3	$[-X, Y, -Z]$	$\left[\frac{5}{8}, \frac{1}{8}, \frac{3}{4} - z\right]$	`[3]`
4	$[X, -Y, -Z]$	$\left[\frac{5}{8}, \frac{1}{8}, \frac{3}{4} - z\right]$	`[4]`
5	$[-X, -Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, -z\right]$	`[5]`
6	$[X, Y, -Z]$	$\left[\frac{7}{8}, \frac{7}{8}, -z\right]$	`[6]`
7	$[X, -Y, Z]$	$\left[\frac{3}{8}, \frac{7}{8}, z + \frac{1}{4}\right]$	`[7]`
8	$[-X, Y, Z]$	$\left[\frac{3}{8}, \frac{7}{8}, z + \frac{1}{4}\right]$	`[8]`

* Wyckoff site: `32h`, site symmetry: `1`

Table 26: Wyckoff bond: `32a@32h`

No.	vector	center	mapping
1	$[X, Y, Z]$	$[x, y, z]$	`[1]`
2	$[-X, -Y, Z]$	$\left[\frac{3}{4} - x, \frac{3}{4} - y, z\right]$	`[2]`
3	$[-X, Y, -Z]$	$\left[\frac{3}{4} - x, y, \frac{3}{4} - z\right]$	`[3]`
4	$[X, -Y, -Z]$	$\left[x, \frac{3}{4} - y, \frac{3}{4} - z\right]$	`[4]`
5	$[-X, -Y, -Z]$	$[-x, -y, -z]$	`[5]`
6	$[X, Y, -Z]$	$\left[x + \frac{1}{4}, y + \frac{1}{4}, -z\right]$	`[6]`
7	$[X, -Y, Z]$	$\left[x + \frac{1}{4}, -y, z + \frac{1}{4}\right]$	`[7]`
8	$[-X, Y, Z]$	$\left[-x, y + \frac{1}{4}, z + \frac{1}{4}\right]$	`[8]`