

No. 1 C_1 1 [triclinic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 0 & 0 & 0 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$\mathbb{Q}_0^{(s,A)}$	1									

No. 2 C_i -1 [triclinic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 0 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & 0 & 0 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$Q_0^{(s,A_g)}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$								
#2	$Q_1^{(s,A_u,1)}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$								

No. 3 C_2 2 (b-axis setting) [monoclinic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 0 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & 0 & 0 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$\mathbb{Q}_0^{(s,A)}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$								
#2	$\mathbb{Q}_1^{(s,B,1)}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$								

No. 4 C_s m (b-axis setting) [monoclinic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 0 & 1 & 0 \end{pmatrix} \quad \begin{pmatrix} 0 & -1 & 0 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$Q_0^{(s,A')}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$								
#2	$Q_1^{(s,A'')}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$								

No. 5 C_{2h} $2/m$ (b-axis setting) [monoclinic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 1 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & 1 & -1 \end{pmatrix} \quad \begin{pmatrix} -1 & -1 & -1 \end{pmatrix} \quad \begin{pmatrix} 1 & -1 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_g)}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$						
#2 $Q_1^{(s,A_u)}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$						
#3 $Q_1^{(s,B_u,1)}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$						
#4 $Q_2^{(s,B_g,1)}$	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$						

No. 6 D_2 222 [orthorhombic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 1 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & -1 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & 1 & -1 \end{pmatrix} \quad \begin{pmatrix} 1 & -1 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A)}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$						
#2 $Q_1^{(s,B_1)}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$						
#3 $Q_1^{(s,B_2)}$	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$						
#4 $Q_1^{(s,B_3)}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$						

No. 7 C_{2v} $mm2$ [orthorhombic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 1 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & -1 & 0 \end{pmatrix} \quad \begin{pmatrix} 1 & -1 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & 1 & 0 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$Q_0^{(s,A_1)}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$						
#2	$Q_1^{(s,B_1)}$	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$						
#3	$Q_1^{(s,B_2)}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$						
#4	$Q_2^{(s,A_2)}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$						

No. 8 D_{2h} mmm [orthorhombic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & -1 \end{pmatrix} \begin{pmatrix} -1 & -1 & 1 \\ 1 & -1 & 1 \end{pmatrix} \begin{pmatrix} -1 & 1 & -1 \\ -1 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & -1 & -1 \\ -1 & -1 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $\mathbb{Q}_0^{(s,A_g)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#2 $\mathbb{Q}_1^{(s,B_{1u})}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#3 $\mathbb{Q}_1^{(s,B_{2u})}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#4 $\mathbb{Q}_1^{(s,B_{3u})}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#5 $\mathbb{Q}_2^{(s,B_{1g})}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#6 $\mathbb{Q}_2^{(s,B_{2g})}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#7 $\mathbb{Q}_2^{(s,B_{3g})}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#8 $\mathbb{Q}_3^{(s,A_u)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		

No. 9 C_4 4 [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 0 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & 0 & 0 \end{pmatrix} \quad \begin{pmatrix} 0 & 1 & 0 \end{pmatrix} \quad \begin{pmatrix} 0 & -1 & 0 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$Q_0^{(s,A)}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$						
#2	$Q_{1,0}^{(s,E)}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	0	0						
#3	$Q_{1,1}^{(s,E)}$	0	0	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$						
#4	$Q_2^{(s,B,1)}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$						

No. 10 S_4 -4 [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & 0 & 1 \end{pmatrix} \quad \begin{pmatrix} 0 & -1 & -1 \end{pmatrix} \quad \begin{pmatrix} 0 & 1 & -1 \end{pmatrix}$$

* site basis

type		1	2	3	4	5	6	7	8	9	10
#1	$Q_0^{(s,A)}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$						
#2	$Q_1^{(s,B)}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$						
#3	$Q_{1,0}^{(s,E)}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	0	0						
#4	$Q_{1,1}^{(s,E)}$	0	0	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$						

No. 11 C_{4h} $4/m$ [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 0 & 1 \\ 1 & 0 & -1 \end{pmatrix} \quad \begin{pmatrix} -1 & 0 & 1 \\ 0 & -1 & -1 \end{pmatrix} \quad \begin{pmatrix} 0 & 1 & 1 \\ 0 & 1 & -1 \end{pmatrix} \quad \begin{pmatrix} 0 & -1 & 1 \\ -1 & 0 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_g)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#2 $Q_1^{(s,A_u)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#3 $Q_{1,0}^{(s,E_u)}$	$\frac{1}{2}$	$-\frac{1}{2}$	0	0	$-\frac{1}{2}$	$\frac{1}{2}$	0	0		
#4 $Q_{1,1}^{(s,E_u)}$	0	0	$\frac{1}{2}$	$-\frac{1}{2}$	0	0	$-\frac{1}{2}$	$\frac{1}{2}$		
#5 $Q_2^{(s,B_g,1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#6 $Q_{2,0}^{(s,E_g)}$	0	0	$\frac{1}{2}$	$-\frac{1}{2}$	0	0	$\frac{1}{2}$	$-\frac{1}{2}$		
#7 $Q_{2,1}^{(s,E_g)}$	$-\frac{1}{2}$	$\frac{1}{2}$	0	0	$-\frac{1}{2}$	$\frac{1}{2}$	0	0		
#8 $Q_3^{(s,B_u,2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		

No. 12 D_4 422 [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 2 & 1 & 1 \\ -1 & -2 & -1 \end{pmatrix} \quad \begin{pmatrix} -2 & -1 & 1 \\ -1 & 2 & 1 \end{pmatrix} \quad \begin{pmatrix} 2 & -1 & -1 \\ 1 & -2 & 1 \end{pmatrix} \quad \begin{pmatrix} -2 & 1 & -1 \\ 1 & 2 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#2 $Q_1^{(s,A_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#3 $Q_{1,0}^{(s,E)}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$		
#4 $Q_{1,1}^{(s,E)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$		
#5 $Q_2^{(s,B_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#6 $Q_2^{(s,B_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#7 $Q_{2,0}^{(s,E)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$		
#8 $Q_{2,1}^{(s,E)}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$		

No. 13 C_{4v} $4mm$ [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 2 & 1 & 0 \\ 2 & -1 & 0 \end{pmatrix} \begin{pmatrix} -2 & -1 & 0 \\ -1 & -2 & 0 \end{pmatrix} \begin{pmatrix} -1 & 2 & 0 \\ 1 & 2 & 0 \end{pmatrix} \begin{pmatrix} 1 & -2 & 0 \\ -2 & 1 & 0 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#2 $Q_{1,0}^{(s,E)}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$		
#3 $Q_{1,1}^{(s,E)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$		
#4 $Q_2^{(s,B_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#5 $Q_2^{(s,B_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#6 $Q_{3,0}^{(s,E,1)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$		
#7 $Q_{3,1}^{(s,E,1)}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$		
#8 $Q_4^{(s,A_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		

No. 14 D_{2d} $-42m$ ($-42m$ setting) [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \end{pmatrix} \begin{pmatrix} -2 & -1 & 1 \\ 1 & -2 & -1 \end{pmatrix} \begin{pmatrix} 2 & -1 & -1 \\ -1 & 2 & -1 \end{pmatrix} \begin{pmatrix} -2 & 1 & -1 \\ -1 & -2 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	
#2 $Q_1^{(s,B_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	
#3 $Q_{1,0}^{(s,E)}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	
#4 $Q_{1,1}^{(s,E)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	
#5 $Q_2^{(s,B_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	
#6 $Q_{2,0}^{(s,E)}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	
#7 $Q_{2,1}^{(s,E)}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	
#8 $Q_3^{(s,A_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	

No. 14 $D_{2d} - 1$ $-4m2$ ($-4m2$ setting) [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 2 & 1 & 1 \\ 2 & -1 & 1 \end{pmatrix} \begin{pmatrix} -2 & -1 & 1 \\ 1 & -2 & -1 \end{pmatrix} \begin{pmatrix} 1 & 2 & -1 \\ -1 & 2 & -1 \end{pmatrix} \begin{pmatrix} -1 & -2 & -1 \\ -2 & 1 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		
#2 $Q_1^{(s,B_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#3 $Q_{1,0}^{(s,E)}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$		
#4 $Q_{1,1}^{(s,E)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$		
#5 $Q_2^{(s,B_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$		
#6 $Q_{2,0}^{(s,E)}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$		
#7 $Q_{2,1}^{(s,E)}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{10}$	$-\frac{\sqrt{5}}{5}$	$\frac{\sqrt{5}}{5}$	$-\frac{\sqrt{5}}{10}$	$\frac{\sqrt{5}}{10}$		
#8 $Q_3^{(s,A_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$		

No. 15 D_{4h} $4/mmm$ [tetragonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 2 & 1 & 1 \\ -1 & -2 & -1 \\ -2 & 1 & 1 \\ -1 & 2 & -1 \end{pmatrix} \begin{pmatrix} -2 & -1 & 1 \\ -1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \begin{pmatrix} 2 & -1 & -1 \\ 1 & -2 & 1 \\ -1 & -2 & 1 \end{pmatrix} \begin{pmatrix} -2 & 1 & -1 \\ -2 & -1 & -1 \\ 1 & 2 & 1 \end{pmatrix} \begin{pmatrix} 1 & 2 & -1 \\ 2 & 1 & -1 \\ 1 & -2 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_{1g})}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$				
#2 $Q_1^{(s,A_{2u})}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$
	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$				
#3 $Q_{1,0}^{(s,E_u)}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$
	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$				
#4 $Q_{1,1}^{(s,E_u)}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$
	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$				
#5 $Q_2^{(s,B_{1g})}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$				
#6 $Q_2^{(s,B_{2g})}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$				
#7 $Q_{2,0}^{(s,E_g)}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$
	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$				
#8 $Q_{2,1}^{(s,E_g)}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$
	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$				

continued ...

表 16

type	1	2	3	4	5	6	7	8	9	10
#9 $\mathbb{Q}_3^{(s, B_{1u})}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	$-\frac{1}{4}$ $\frac{1}{4}$	$-\frac{1}{4}$ $\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$
#10 $\mathbb{Q}_3^{(s, B_{2u})}$	$\frac{1}{4}$ $\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	$-\frac{1}{4}$ $-\frac{1}{4}$	$-\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	$\frac{1}{4}$ $\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$
#11 $\mathbb{Q}_{3,0}^{(s, E_u, 1)}$	$\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$
#12 $\mathbb{Q}_{3,1}^{(s, E_u, 1)}$	$-\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$
#13 $\mathbb{Q}_4^{(s, A_{2g})}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$-\frac{1}{4}$ $-\frac{1}{4}$	$-\frac{1}{4}$ $-\frac{1}{4}$	$-\frac{1}{4}$ $\frac{1}{4}$	$-\frac{1}{4}$ $\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
#14 $\mathbb{Q}_{4,0}^{(s, E_g, 1)}$	$-\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$
#15 $\mathbb{Q}_{4,1}^{(s, E_g, 1)}$	$\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$ $\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$ $-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$ $\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$ $-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$
#16 $\mathbb{Q}_5^{(s, A_{1u})}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$ $-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$

No. 16 C_3 3 [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 0 \end{pmatrix} \quad \begin{pmatrix} 1 & 0 & 0 \end{pmatrix} \quad \begin{pmatrix} 0 & 1 & 0 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A)}$	$\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{3}$							
#2 $Q_{1,0}^{(s,E)}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{3}$	$-\frac{\sqrt{6}}{6}$							
#3 $Q_{1,1}^{(s,E)}$	$-\frac{\sqrt{2}}{2}$	0	$\frac{\sqrt{2}}{2}$							

No. 17 $C_{3i} -3$ [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ 0 & -1 & -1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 1 \end{pmatrix} \begin{pmatrix} 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 1 & -1 \end{pmatrix} \begin{pmatrix} -1 & 0 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_g)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $Q_1^{(s,A_u)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$				
#3 $Q_{1,0}^{(s,E_u)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$				
#4 $Q_{1,1}^{(s,E_u)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$				
#5 $Q_{2,0}^{(s,E_g,1)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$				
#6 $Q_{2,1}^{(s,E_g,1)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$				

No. 18 D_3 312 (312 setting) [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ 0 & 1 & 1 \end{pmatrix} \begin{pmatrix} 0 & -1 & -1 \\ -1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & 1 & -1 \\ 1 & 0 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $\mathbb{Q}_0^{(s,A_1)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $\mathbb{Q}_1^{(s,A_2)}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#3 $\mathbb{Q}_{1,0}^{(s,E)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$				
#4 $\mathbb{Q}_{1,1}^{(s,E)}$	$-\frac{1}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	0	$\frac{1}{2}$				
#5 $\mathbb{Q}_{2,0}^{(s,E,1)}$	$-\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	0	$\frac{1}{2}$				
#6 $\mathbb{Q}_{2,1}^{(s,E,1)}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$				

No. 18 $D_3 - 1$ 321 (321 setting) [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & -1 & 1 \\ -2 & -1 & 1 \end{pmatrix} \begin{pmatrix} 2 & 1 & -1 \\ -1 & -2 & -1 \end{pmatrix} \begin{pmatrix} -1 & 1 & -1 \\ 1 & 2 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $Q_1^{(s,A_2)}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#3 $Q_{1,0}^{(s,E)}$	$\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	0	$-\frac{1}{2}$				
#4 $Q_{1,1}^{(s,E)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$				
#5 $Q_{2,0}^{(s,E,1)}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$				
#6 $Q_{2,1}^{(s,E,1)}$	$-\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	0	$\frac{1}{2}$				

No. 19 C_{3v} $3m1$ (3m1 setting) [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 0 \\ 1 & 1 & 0 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} 0 & 1 & 0 \\ 0 & -1 & 0 \end{pmatrix} \begin{pmatrix} -1 & 0 & 0 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $Q_{1,0}^{(s,E)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$				
#3 $Q_{1,1}^{(s,E)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$				
#4 $Q_{2,0}^{(s,E,2)}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$				
#5 $Q_{2,1}^{(s,E,2)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$				
#6 $Q_3^{(s,A_2)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$				

No. 19 $C_{3v} - 1$ $31m$ (31m setting) [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & -1 & 0 \\ -1 & 1 & 0 \end{pmatrix} \begin{pmatrix} 1 & 2 & 0 \end{pmatrix} \begin{pmatrix} -2 & -1 & 0 \end{pmatrix} \begin{pmatrix} 2 & 1 & 0 \end{pmatrix} \begin{pmatrix} -1 & -2 & 0 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $Q_{1,0}^{(s,E)}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$				
#3 $Q_{1,1}^{(s,E)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$				
#4 $Q_{2,0}^{(s,E,2)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$				
#5 $Q_{2,1}^{(s,E,2)}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{1}{2}$	0	$\frac{1}{2}$				
#6 $Q_3^{(s,A_2)}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				

No. 20 D_{3d} $-31m$ (-31m setting) [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & -1 & 1 \\ -2 & -1 & 1 \\ -1 & -2 & -1 \end{pmatrix} \quad \begin{pmatrix} -2 & -1 & -1 \\ -1 & 1 & -1 \\ 2 & 1 & -1 \end{pmatrix} \quad \begin{pmatrix} 1 & 2 & -1 \\ 2 & 1 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & -1 & -1 \\ -1 & -2 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 2 & 1 \\ -1 & 1 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_{1g})}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_1^{(s,A_{2u})}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#3 $Q_{1,0}^{(s,E_u)}$	$\frac{\sqrt{2}}{4}$ 0	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
#4 $Q_{1,1}^{(s,E_u)}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#5 $Q_{2,0}^{(s,E_g,1)}$	$\frac{\sqrt{2}}{4}$ 0	$\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
#6 $Q_{2,1}^{(s,E_g,1)}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#7 $Q_{2,0}^{(s,E_g,2)}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#8 $Q_{2,1}^{(s,E_g,2)}$	$\frac{\sqrt{2}}{4}$ 0	$-\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#9 $Q_3^{(s,A_{1u})}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$

continued ...

表 23

type		1	2	3	4	5	6	7	8	9	10
		$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$								
#10	$\mathbb{Q}_{3,0}^{(s,E_u,2)}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$								
#11	$\mathbb{Q}_{3,1}^{(s,E_u,2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
		0	$\frac{\sqrt{2}}{4}$								
#12	$\mathbb{Q}_4^{(s,A_{2g})}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								

No. 20 $D_{3d} - 1$ $-3m1$ (-3m1 setting) [trigonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ 0 & 1 & 1 \\ -1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 0 & 1 & -1 \\ 1 & 1 & -1 \\ 0 & -1 & -1 \end{pmatrix} \begin{pmatrix} 1 & 0 & -1 \\ 0 & -1 & 1 \end{pmatrix} \begin{pmatrix} -1 & -1 & -1 \\ -1 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 1 \\ 1 & 1 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_{1g})}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_1^{(s,A_{2u})}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#3 $Q_{1,0}^{(s,E_u)}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#4 $Q_{1,1}^{(s,E_u)}$	$-\frac{\sqrt{2}}{4}$ 0	$\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#5 $Q_{2,0}^{(s,E_g,1)}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#6 $Q_{2,1}^{(s,E_g,1)}$	$-\frac{\sqrt{2}}{4}$ 0	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#7 $Q_{2,0}^{(s,E_g,2)}$	$-\frac{\sqrt{2}}{4}$ 0	$\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
#8 $Q_{2,1}^{(s,E_g,2)}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#9 $Q_3^{(s,A_{1u})}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$

continued ...

表 24

type		1	2	3	4	5	6	7	8	9	10
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								
#10	$\mathbb{Q}_{3,0}^{(s,E_u,2)}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
		0	$-\frac{\sqrt{2}}{4}$								
#11	$\mathbb{Q}_{3,1}^{(s,E_u,2)}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$								
#12	$\mathbb{Q}_4^{(s,A_{2g})}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$
		$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$								

No. 21 C_6 6 [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & -1 & 0 \\ -1 & -2 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & 1 & 0 \\ 1 & 2 & 0 \end{pmatrix} \quad \begin{pmatrix} -2 & -1 & 0 \\ 2 & 1 & 0 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A)}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $Q_{1,0}^{(s,E_1)}$	$\frac{1}{2}$	$-\frac{1}{2}$	0	$-\frac{1}{2}$	$\frac{1}{2}$	0				
#3 $Q_{1,1}^{(s,E_1)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$				
#4 $Q_{2,0}^{(s,E_2)}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$				
#5 $Q_{2,1}^{(s,E_2)}$	$\frac{1}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{1}{2}$	0				
#6 $Q_3^{(s,B,1)}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				

No. 22 C_{3h} -6 [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ 1 & 0 & -1 \end{pmatrix} \quad \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & -1 & -1 \\ 0 & 1 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A')}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$				
#2 $Q_1^{(s,A'')}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$				
#3 $Q_{1,0}^{(s,E')}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$				
#4 $Q_{1,1}^{(s,E')}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	0				
#5 $Q_{2,0}^{(s,E'')}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{3}$				
#6 $Q_{2,1}^{(s,E'')}$	$-\frac{1}{2}$	0	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	0				

No. 23 C_{6h} $6/m$ [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ -1 & 0 & 1 \\ 0 & 1 & -1 \end{pmatrix} \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & -1 \\ 1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 1 \\ -1 & -1 & -1 \end{pmatrix} \begin{pmatrix} 0 & 1 & 1 \\ -1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 0 & -1 & 1 \\ 0 & -1 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_g)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_1^{(s,A_u)}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$
#3 $Q_{1,0}^{(s,E_{1u})}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#4 $Q_{1,1}^{(s,E_{1u})}$	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
#5 $Q_{2,0}^{(s,E_{1g})}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$
#6 $Q_{2,1}^{(s,E_{1g})}$	$-\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#7 $Q_{2,0}^{(s,E_{2g})}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$
#8 $Q_{2,1}^{(s,E_{2g})}$	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$ 0	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#9 $Q_3^{(s,B_u,2)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$

continued ...

表 27

type		1	2	3	4	5	6	7	8	9	10
		$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$								
#10	$\mathbb{Q}_{3,0}^{(s,E_{2u})}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$								
#11	$\mathbb{Q}_{3,1}^{(s,E_{2u})}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
		$-\frac{\sqrt{2}}{4}$	0								
#12	$\mathbb{Q}_4^{(s,B_g,1)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								

No. 24 D_6 622 [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ 0 & -1 & -1 \\ 0 & -1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 1 & 1 \\ -1 & 0 & -1 \\ -1 & 0 & 1 \end{pmatrix} \begin{pmatrix} 0 & 1 & -1 \\ 1 & 1 & -1 \end{pmatrix} \begin{pmatrix} 1 & 0 & -1 \\ 1 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & -1 & -1 \\ 0 & 1 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_1^{(s,A_2)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#3 $Q_{1,0}^{(s,E_1)}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$
#4 $Q_{1,1}^{(s,E_1)}$	$-\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#5 $Q_{2,0}^{(s,E_1)}$	$-\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#6 $Q_{2,1}^{(s,E_1)}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#7 $Q_{2,0}^{(s,E_2)}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$
#8 $Q_{2,1}^{(s,E_2)}$	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$ 0	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#9 $Q_3^{(s,B_2)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$

continued ...

表 28

type		1	2	3	4	5	6	7	8	9	10
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								
#10	$\mathbb{Q}_{3,0}^{(s,E_2)}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
		$\frac{\sqrt{2}}{4}$	0								
#11	$\mathbb{Q}_{3,1}^{(s,E_2)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$								
#12	$\mathbb{Q}_4^{(s,B_1)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								

No. 25 C_{6v} $6mm$ [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 3 & 1 & 0 \\ 1 & -2 & 0 \\ -3 & -2 & 0 \end{pmatrix} \quad \begin{pmatrix} -3 & -1 & 0 \\ -2 & 1 & 0 \\ 1 & 3 & 0 \end{pmatrix} \quad \begin{pmatrix} -1 & 2 & 0 \\ 3 & 2 & 0 \end{pmatrix} \quad \begin{pmatrix} -2 & -3 & 0 \\ -1 & -3 & 0 \end{pmatrix} \quad \begin{pmatrix} 2 & 3 & 0 \\ 2 & -1 & 0 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_{1,0}^{(s,E_1)}$	$\frac{5\sqrt{42}}{84}$ $-\frac{\sqrt{42}}{21}$	$-\frac{5\sqrt{42}}{84}$ $-\frac{\sqrt{42}}{84}$	$-\frac{\sqrt{42}}{21}$	$-\frac{\sqrt{42}}{84}$	$\frac{\sqrt{42}}{84}$	$\frac{\sqrt{42}}{21}$	$-\frac{5\sqrt{42}}{84}$	$\frac{\sqrt{42}}{21}$	$\frac{\sqrt{42}}{84}$	$\frac{5\sqrt{42}}{84}$
#3 $Q_{1,1}^{(s,E_1)}$	$\frac{\sqrt{14}}{28}$ $-\frac{\sqrt{14}}{14}$	$-\frac{\sqrt{14}}{28}$ $\frac{3\sqrt{14}}{28}$	$\frac{\sqrt{14}}{14}$	$-\frac{3\sqrt{14}}{28}$	$\frac{3\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{14}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{14}$	$-\frac{3\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$
#4 $Q_{2,0}^{(s,E_2)}$	$\frac{11\sqrt{6}}{84}$ $\frac{\sqrt{6}}{42}$	$\frac{11\sqrt{6}}{84}$ $-\frac{13\sqrt{6}}{84}$	$\frac{\sqrt{6}}{42}$	$-\frac{13\sqrt{6}}{84}$	$-\frac{13\sqrt{6}}{84}$	$\frac{\sqrt{6}}{42}$	$\frac{11\sqrt{6}}{84}$	$\frac{\sqrt{6}}{42}$	$-\frac{13\sqrt{6}}{84}$	$\frac{11\sqrt{6}}{84}$
#5 $Q_{2,1}^{(s,E_2)}$	$-\frac{5\sqrt{2}}{28}$ $-\frac{2\sqrt{2}}{7}$	$-\frac{5\sqrt{2}}{28}$ $\frac{3\sqrt{2}}{28}$	$\frac{2\sqrt{2}}{7}$	$-\frac{3\sqrt{2}}{28}$	$-\frac{3\sqrt{2}}{28}$	$\frac{2\sqrt{2}}{7}$	$\frac{5\sqrt{2}}{28}$	$-\frac{2\sqrt{2}}{7}$	$\frac{3\sqrt{2}}{28}$	$\frac{5\sqrt{2}}{28}$
#6 $Q_3^{(s,B_1)}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$
#7 $Q_3^{(s,B_2)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#8 $Q_{4,0}^{(s,E_2,1)}$	$\frac{5\sqrt{2}}{28}$ $-\frac{2\sqrt{2}}{7}$	$\frac{5\sqrt{2}}{28}$ $\frac{3\sqrt{2}}{28}$	$-\frac{2\sqrt{2}}{7}$	$\frac{3\sqrt{2}}{28}$	$\frac{3\sqrt{2}}{28}$	$-\frac{2\sqrt{2}}{7}$	$\frac{5\sqrt{2}}{28}$	$-\frac{2\sqrt{2}}{7}$	$\frac{3\sqrt{2}}{28}$	$\frac{5\sqrt{2}}{28}$
#9 $Q_{4,1}^{(s,E_2,1)}$	$\frac{11\sqrt{6}}{84}$	$\frac{11\sqrt{6}}{84}$	$\frac{\sqrt{6}}{42}$	$-\frac{13\sqrt{6}}{84}$	$-\frac{13\sqrt{6}}{84}$	$\frac{\sqrt{6}}{42}$	$-\frac{11\sqrt{6}}{84}$	$-\frac{\sqrt{6}}{42}$	$\frac{13\sqrt{6}}{84}$	$-\frac{11\sqrt{6}}{84}$

continued ...

表 29

type		1	2	3	4	5	6	7	8	9	10
		$-\frac{\sqrt{6}}{42}$	$\frac{13\sqrt{6}}{84}$								
#10	$Q_{5,0}^{(s,E_1,1)}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{14}$	$-\frac{3\sqrt{14}}{28}$	$\frac{3\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{14}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{14}$	$\frac{3\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$
		$\frac{\sqrt{14}}{14}$	$-\frac{3\sqrt{14}}{28}$								
#11	$Q_{5,1}^{(s,E_1,1)}$	$-\frac{5\sqrt{42}}{84}$	$\frac{5\sqrt{42}}{84}$	$\frac{\sqrt{42}}{21}$	$\frac{\sqrt{42}}{84}$	$-\frac{\sqrt{42}}{84}$	$-\frac{\sqrt{42}}{21}$	$-\frac{5\sqrt{42}}{84}$	$\frac{\sqrt{42}}{21}$	$\frac{\sqrt{42}}{84}$	$\frac{5\sqrt{42}}{84}$
		$-\frac{\sqrt{42}}{21}$	$-\frac{\sqrt{42}}{84}$								
#12	$Q_6^{(s,A_2)}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								

No. 26 D_{3h} $-6m2$ ($-6m2$ setting) [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} -1 & -1 & 1 \\ 0 & 1 & 1 \\ 0 & 1 & -1 \end{pmatrix} \begin{pmatrix} 0 & -1 & -1 \\ 0 & -1 & 1 \\ 1 & 0 & -1 \end{pmatrix} \begin{pmatrix} -1 & 0 & -1 \\ -1 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 1 & -1 \\ 1 & 1 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 1 \\ -1 & -1 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A'_1)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_1^{(s,A''_2)}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$
#3 $Q_{1,0}^{(s,E')}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
#4 $Q_{1,1}^{(s,E')}$	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$ 0	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$
#5 $Q_{2,0}^{(s,E')}$	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$
#6 $Q_{2,1}^{(s,E')}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
#7 $Q_{2,0}^{(s,E'')}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
#8 $Q_{2,1}^{(s,E'')}$	$-\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	0	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$
#9 $Q_3^{(s,A'_2)}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$

continued ...

表 30

type		1	2	3	4	5	6	7	8	9	10
		$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$								
#10	$\mathbb{Q}_{3,0}^{(s,E'')}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$
		$-\frac{\sqrt{2}}{4}$	0								
#11	$\mathbb{Q}_{3,1}^{(s,E'')}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
		$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$								
#12	$\mathbb{Q}_4^{(s,A_1'')}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								

No. 26 $D_{3h} - 1$ $-62m$ ($-62m$ setting) [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & -1 & 1 \\ -2 & -1 & 1 \\ -2 & -1 & -1 \end{pmatrix} \quad \begin{pmatrix} 2 & 1 & -1 \\ 1 & -1 & -1 \\ 1 & 2 & -1 \end{pmatrix} \quad \begin{pmatrix} -1 & -2 & -1 \\ 2 & 1 & 1 \end{pmatrix} \quad \begin{pmatrix} -1 & 1 & -1 \\ -1 & -2 & 1 \end{pmatrix} \quad \begin{pmatrix} 1 & 2 & 1 \\ -1 & 1 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A'_1)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_1^{(s,A'_2)}$	$\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$ $-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#3 $Q_{1,0}^{(s,E')}$	$\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$ 0	0	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
#4 $Q_{1,1}^{(s,E')}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#5 $Q_{2,0}^{(s,E')}$	$\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#6 $Q_{2,1}^{(s,E')}$	$\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$ 0	0	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
#7 $Q_{2,0}^{(s,E'')}$	$\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$ 0	0	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
#8 $Q_{2,1}^{(s,E'')}$	$-\frac{\sqrt{6}}{12}$ $\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$ $-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
#9 $Q_3^{(s,A'_2)}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$

continued ...

表 31

type		1	2	3	4	5	6	7	8	9	10
		$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$								
#10	$\mathbb{Q}_{3,0}^{(s,E'')}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$
		$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{6}$								
#11	$\mathbb{Q}_{3,1}^{(s,E'')}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
		$\frac{\sqrt{2}}{4}$	0								
#12	$\mathbb{Q}_4^{(s,A_1'')}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
		$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$								

No. 27 D_{6h} $6/mmm$ [hexagonal] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 3 & 1 & 1 \\ -2 & 1 & -1 \\ 2 & 3 & 1 \\ -1 & -3 & 1 \\ 1 & -2 & -1 \end{pmatrix} \begin{pmatrix} -3 & -1 & 1 \\ 3 & 2 & -1 \\ 1 & -2 & 1 \\ 3 & 1 & -1 \\ 2 & 3 & -1 \end{pmatrix} \begin{pmatrix} 2 & -1 & -1 \\ -1 & -3 & -1 \\ -3 & -1 & -1 \\ 2 & -1 & 1 \\ -2 & -3 & -1 \end{pmatrix} \begin{pmatrix} -3 & -2 & -1 \\ -1 & 2 & 1 \\ -2 & 1 & 1 \\ -3 & -2 & 1 \\ -1 & 2 & -1 \end{pmatrix} \begin{pmatrix} 1 & 3 & -1 \\ -2 & -3 & 1 \\ 3 & 2 & 1 \\ 1 & 3 & 1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_{1g})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#2 $Q_1^{(s,A_{2u})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
#3 $Q_{1,0}^{(s,E_{1u})}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$
	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$
	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$						
#4 $Q_{1,1}^{(s,E_{1u})}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$
	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$						
#5 $Q_{2,0}^{(s,E_{1g})}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$
	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$
	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$						
#6 $Q_{2,1}^{(s,E_{1g})}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$

continued ...

表 32

type	1	2	3	4	5	6	7	8	9	10
	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$
	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$						
#7 $\mathbb{Q}_{2,0}^{(s,E_{2g})}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$
	$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$
	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$						
#8 $\mathbb{Q}_{2,1}^{(s,E_{2g})}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{2}{7}$	$-\frac{3}{28}$
	$-\frac{3}{28}$	$\frac{2}{7}$	$-\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$-\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$
	$\frac{2}{7}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$\frac{2}{7}$						
#9 $\mathbb{Q}_3^{(s,B_{1u})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#10 $\mathbb{Q}_3^{(s,B_{2u})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#11 $\mathbb{Q}_{3,0}^{(s,E_{2u})}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$
	$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$
	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$						
#12 $\mathbb{Q}_{3,1}^{(s,E_{2u})}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$\frac{2}{7}$	$-\frac{3}{28}$	$-\frac{5}{28}$	$\frac{2}{7}$	$-\frac{3}{28}$	$\frac{2}{7}$	$-\frac{3}{28}$
	$-\frac{3}{28}$	$\frac{2}{7}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$
	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{2}{7}$						
#13 $\mathbb{Q}_4^{(s,B_{1g})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
#14 $\mathbb{Q}_4^{(s,B_{2g})}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$

continued ...

表 32

type		1	2	3	4	5	6	7	8	9	10
		$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						
#15	$\mathbb{Q}_{4,0}^{(s,E_{2g},1)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$
		$\frac{3}{28}$	$-\frac{2}{7}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$
		$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{2}{7}$						
#16	$\mathbb{Q}_{4,1}^{(s,E_{2g},1)}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$
		$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$
		$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$						
#17	$\mathbb{Q}_{5,0}^{(s,E_{1u},1)}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$
		$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$
		$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$						
#18	$\mathbb{Q}_{5,1}^{(s,E_{1u},1)}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$
		$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$
		$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$						
#19	$\mathbb{Q}_{5,0}^{(s,E_{2u},1)}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{5}{28}$	$\frac{2}{7}$	$-\frac{3}{28}$	$-\frac{5}{28}$	$\frac{2}{7}$	$-\frac{3}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$
		$\frac{3}{28}$	$-\frac{2}{7}$	$-\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$	$-\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$
		$\frac{2}{7}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$\frac{2}{7}$						
#20	$\mathbb{Q}_{5,1}^{(s,E_{2u},1)}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$
		$-\frac{13\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$
		$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$						
#21	$\mathbb{Q}_6^{(s,A_{2g})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#22	$\mathbb{Q}_{6,0}^{(s,E_{1g},1)}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$

continued ...

表 32

type		1	2	3	4	5	6	7	8	9	10
		$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$
		$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$						
#23	$\mathbb{Q}_{6,1}^{(s,E_{1g},1)}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$
		$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$
		$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$						
#24	$\mathbb{Q}_7^{(s,A_{1u})}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
		$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
		$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						

No. 28 T 23 [cubic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 1 & 1 & 0 \\ 0 & -1 & 1 \\ -1 & 0 & 1 \end{pmatrix} \begin{pmatrix} -1 & -1 & 0 \\ 0 & -1 & -1 \\ 1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \end{pmatrix} \begin{pmatrix} -1 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix} \begin{pmatrix} 0 & 1 & 1 \\ -1 & 0 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A)}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$ $\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$	$\frac{\sqrt{3}}{6}$
#2 $Q_{1,0}^{(s,T)}$	$\frac{\sqrt{2}}{4}$ $-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$ $\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0	0	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$
#3 $Q_{1,1}^{(s,T)}$	$\frac{\sqrt{2}}{4}$ 0	$-\frac{\sqrt{2}}{4}$ 0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	0
#4 $Q_{1,2}^{(s,T)}$	0 $\frac{\sqrt{2}}{4}$	0 $-\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$
#5 $Q_{2,0}^{(s,E)}$	$-\frac{\sqrt{6}}{6}$ $\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$ $\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{6}$	$-\frac{\sqrt{6}}{6}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
#6 $Q_{2,1}^{(s,E)}$	0 $\frac{\sqrt{2}}{4}$	0 $\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$
#7 $Q_{2,0}^{(s,T)}$	0 0	0 0	0	0	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	0	0
#8 $Q_{2,1}^{(s,T)}$	0 $-\frac{1}{2}$	0 $-\frac{1}{2}$	0	0	0	0	0	0	$\frac{1}{2}$	$\frac{1}{2}$
#9 $Q_{2,2}^{(s,T)}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	0	0	0	0	0	0

continued ...

表 33

type		1	2	3	4	5	6	7	8	9	10
		0	0								
#10	$\mathbb{Q}_{3,0}^{(s,T,2)}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0	0	0	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$
		$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$								
#11	$\mathbb{Q}_{3,1}^{(s,T,2)}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	0	0
		0	0								
#12	$\mathbb{Q}_{3,2}^{(s,T,2)}$	0	0	0	0	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$
		$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$								

No. 29 T_h $m - 3$ [cubic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 3 & 2 & 1 \\ -1 & -3 & 2 \\ -2 & -1 & 3 \\ 3 & -2 & 1 \\ -2 & -1 & -3 \end{pmatrix} \begin{pmatrix} -3 & -2 & 1 \\ 1 & -3 & -2 \\ 2 & -1 & -3 \\ -1 & -3 & -2 \\ 2 & -1 & 3 \end{pmatrix} \begin{pmatrix} 3 & -2 & -1 \\ -1 & 3 & -2 \\ -3 & -2 & -1 \\ 1 & 3 & -2 \\ 2 & 1 & -3 \end{pmatrix} \begin{pmatrix} -3 & 2 & -1 \\ 2 & 1 & 3 \\ 3 & 2 & -1 \\ -1 & 3 & 2 \\ -2 & 1 & 3 \end{pmatrix} \begin{pmatrix} 1 & 3 & 2 \\ -2 & 1 & -3 \\ -3 & 2 & 1 \\ 1 & -3 & 2 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $\mathbb{Q}_0^{(s,A_g)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#2 $\mathbb{Q}_{1,0}^{(s,T_u)}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$
	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$						
#3 $\mathbb{Q}_{1,1}^{(s,T_u)}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$
	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$						
#4 $\mathbb{Q}_{1,2}^{(s,T_u)}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$
	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$
	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$						
#5 $\mathbb{Q}_{2,0}^{(s,E_g)}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$
	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$
	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$						
#6 $\mathbb{Q}_{2,1}^{(s,E_g)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$

continued ...

表 34

[illegible]

continued ...

表 34

[illegible]

continued ...

表 34

type	1	2	3	4	5	6	7	8	9	10
	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$-\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$\frac{11\sqrt{829}}{3316}$	$-\frac{\sqrt{829}}{829}$	$-\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$	$\frac{\sqrt{829}}{829}$
	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$	$\frac{39\sqrt{829}}{3316}$	$-\frac{39\sqrt{829}}{3316}$						
#23 $\mathbb{Q}_{5,0}^{(s,E_u)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$
	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$-\frac{5}{28}$	$\frac{2}{7}$	$\frac{2}{7}$	$\frac{2}{7}$	$\frac{2}{7}$
	$-\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$						
#24 $\mathbb{Q}_{5,1}^{(s,E_u)}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$
	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$
	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$						

No. 30 O 432 [cubic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 3 & 2 & 1 \\ 1 & -2 & 3 \\ 1 & 3 & 2 \\ -2 & 1 & -3 \\ 1 & 2 & -3 \end{pmatrix} \begin{pmatrix} -3 & -2 & 1 \\ -3 & 1 & 2 \\ -1 & -3 & 2 \\ -2 & -1 & 3 \\ 2 & -3 & 1 \end{pmatrix} \begin{pmatrix} 3 & -2 & -1 \\ -2 & -3 & -1 \\ 1 & -3 & -2 \\ 2 & -1 & -3 \\ 3 & 1 & -2 \end{pmatrix} \begin{pmatrix} -3 & 2 & -1 \\ -1 & -2 & -3 \\ -1 & 3 & -2 \\ -2 & 3 & 1 \\ -1 & 2 & 3 \end{pmatrix} \begin{pmatrix} 2 & 3 & -1 \\ -3 & -1 & -2 \\ 2 & 1 & 3 \\ 3 & -1 & 2 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#2 $Q_{1,0}^{(s,T_1)}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$
	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$
	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$						
#3 $Q_{1,1}^{(s,T_1)}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{28}$
	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$
	$\frac{\sqrt{7}}{14}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$						
#4 $Q_{1,2}^{(s,T_1)}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$
	$\frac{\sqrt{7}}{14}$	$\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{3\sqrt{7}}{28}$	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$\frac{\sqrt{7}}{14}$
	$-\frac{3\sqrt{7}}{28}$	$\frac{\sqrt{7}}{28}$	$-\frac{\sqrt{7}}{14}$	$\frac{3\sqrt{7}}{28}$						
#5 $Q_{2,0}^{(s,E)}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{11\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$
	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$
	$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$						
#6 $Q_{2,1}^{(s,E)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$-\frac{5}{28}$	$-\frac{3}{28}$	$\frac{2}{7}$	$-\frac{5}{28}$	$-\frac{3}{28}$	$\frac{2}{7}$

continued ...

表 35

[illegible]

continued ...

表 35

type		1	2	3	4	5	6	7	8	9	10
		$\frac{5\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$-\frac{4\sqrt{181}}{181}$	$\frac{4\sqrt{181}}{181}$	$\frac{4\sqrt{181}}{181}$	$-\frac{4\sqrt{181}}{181}$	$-\frac{4\sqrt{181}}{181}$	$-\frac{9\sqrt{181}}{724}$
		$-\frac{5\sqrt{181}}{724}$	$\frac{4\sqrt{181}}{181}$	$-\frac{9\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$						
#15	$\mathbb{Q}_{3,1}^{(s,T_2)}$	$-\frac{4\sqrt{181}}{181}$	$\frac{4\sqrt{181}}{181}$	$\frac{4\sqrt{181}}{181}$	$-\frac{4\sqrt{181}}{181}$	$-\frac{9\sqrt{181}}{724}$	$-\frac{4\sqrt{181}}{181}$	$-\frac{5\sqrt{181}}{724}$	$\frac{9\sqrt{181}}{724}$	$-\frac{4\sqrt{181}}{181}$	$\frac{5\sqrt{181}}{724}$
		$\frac{9\sqrt{181}}{724}$	$-\frac{9\sqrt{181}}{724}$	$-\frac{9\sqrt{181}}{724}$	$\frac{9\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$-\frac{9\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$
		$\frac{4\sqrt{181}}{181}$	$\frac{9\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$\frac{4\sqrt{181}}{181}$						
#16	$\mathbb{Q}_{3,2}^{(s,T_2)}$	$\frac{5\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$\frac{5\sqrt{181}}{724}$	$-\frac{9\sqrt{181}}{724}$	$\frac{4\sqrt{181}}{181}$	$\frac{5\sqrt{181}}{724}$	$\frac{9\sqrt{181}}{724}$	$-\frac{4\sqrt{181}}{181}$
		$-\frac{4\sqrt{181}}{181}$	$-\frac{4\sqrt{181}}{181}$	$\frac{4\sqrt{181}}{181}$	$\frac{4\sqrt{181}}{181}$	$\frac{9\sqrt{181}}{724}$	$-\frac{9\sqrt{181}}{724}$	$\frac{9\sqrt{181}}{724}$	$-\frac{9\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$\frac{4\sqrt{181}}{181}$
		$\frac{9\sqrt{181}}{724}$	$-\frac{5\sqrt{181}}{724}$	$-\frac{4\sqrt{181}}{181}$	$-\frac{9\sqrt{181}}{724}$						
#17	$\mathbb{Q}_{4,0}^{(s,E)}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{5}{28}$	$\frac{3}{28}$	$-\frac{2}{7}$	$\frac{5}{28}$	$\frac{3}{28}$	$-\frac{2}{7}$
		$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$-\frac{2}{7}$	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$
		$\frac{3}{28}$	$\frac{5}{28}$	$-\frac{2}{7}$	$\frac{3}{28}$						
#18	$\mathbb{Q}_{4,1}^{(s,E)}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$\frac{11\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$-\frac{11\sqrt{3}}{84}$	$\frac{13\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$
		$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$\frac{\sqrt{3}}{42}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$
		$\frac{13\sqrt{3}}{84}$	$-\frac{11\sqrt{3}}{84}$	$-\frac{\sqrt{3}}{42}$	$\frac{13\sqrt{3}}{84}$						
#19	$\mathbb{Q}_{4,0}^{(s,T_1)}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$
		$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$
		$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$						
#20	$\mathbb{Q}_{4,1}^{(s,T_1)}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$-\frac{5\sqrt{21}}{84}$
		$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$
		$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$						
#21	$\mathbb{Q}_{4,2}^{(s,T_1)}$	$\frac{5\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$	$-\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$
		$-\frac{\sqrt{21}}{21}$	$-\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$-\frac{\sqrt{21}}{21}$
		$-\frac{\sqrt{21}}{84}$	$\frac{5\sqrt{21}}{84}$	$\frac{\sqrt{21}}{21}$	$\frac{\sqrt{21}}{84}$						
#22	$\mathbb{Q}_{4,0}^{(s,T_2)}$	$\frac{111\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$-\frac{11\sqrt{181}}{1267}$	$\frac{59\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{59\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$

continued ...

表 35

type	1	2	3	4	5	6	7	8	9	10
	$-\frac{59\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{11\sqrt{181}}{1267}$	$-\frac{11\sqrt{181}}{1267}$	$\frac{11\sqrt{181}}{1267}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{111\sqrt{181}}{5068}$
	$\frac{59\sqrt{181}}{5068}$	$-\frac{11\sqrt{181}}{1267}$	$-\frac{111\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$						
#23 $\mathbb{Q}_{4,1}^{(s,T_2)}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{11\sqrt{181}}{1267}$	$-\frac{11\sqrt{181}}{1267}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{111\sqrt{181}}{5068}$	$\frac{11\sqrt{181}}{1267}$	$\frac{59\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{59\sqrt{181}}{5068}$
	$\frac{111\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$
	$-\frac{11\sqrt{181}}{1267}$	$\frac{111\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$-\frac{11\sqrt{181}}{1267}$						
	$-\frac{59\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$-\frac{59\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$-\frac{11\sqrt{181}}{1267}$	$-\frac{59\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$	$\frac{11\sqrt{181}}{1267}$
#24 $\mathbb{Q}_{4,2}^{(s,T_2)}$	$\frac{11\sqrt{181}}{1267}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{11\sqrt{181}}{1267}$	$-\frac{11\sqrt{181}}{1267}$	$\frac{111\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$\frac{111\sqrt{181}}{5068}$	$-\frac{111\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$-\frac{11\sqrt{181}}{1267}$
	$\frac{111\sqrt{181}}{5068}$	$\frac{59\sqrt{181}}{5068}$	$\frac{11\sqrt{181}}{1267}$	$-\frac{111\sqrt{181}}{5068}$						

No. 31 T_d $-43m$ [cubic] (orthonormalized)

* site positions (reduced coordinate)

$$\begin{pmatrix} 2 & 1 & 0 \\ 0 & -2 & 1 \\ -1 & 0 & 2 \\ 1 & 2 & 0 \\ 0 & -1 & 2 \end{pmatrix} \begin{pmatrix} -2 & -1 & 0 \\ 0 & -2 & -1 \\ 1 & 0 & -2 \\ 0 & 1 & 2 \\ -1 & 2 & 0 \end{pmatrix} \begin{pmatrix} 2 & -1 & 0 \\ 0 & 2 & -1 \\ -1 & -2 & 0 \\ 2 & 0 & 1 \\ -2 & 0 & 1 \end{pmatrix} \begin{pmatrix} -2 & 1 & 0 \\ 1 & 0 & 2 \\ 0 & 1 & -2 \\ 1 & -2 & 0 \\ 0 & -1 & -2 \end{pmatrix} \begin{pmatrix} 0 & 2 & 1 \\ -1 & 0 & -2 \\ 2 & 0 & -1 \\ -2 & 0 & -1 \end{pmatrix}$$

* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s,A_1)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$						
#2 $Q_{1,0}^{(s,T_2)}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	0	0	0	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$
	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$
	0	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0						
#3 $Q_{1,1}^{(s,T_2)}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	0	0
	0	0	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$	0
	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$						
#4 $Q_{1,2}^{(s,T_2)}$	0	0	0	0	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$
	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{20}$
	$\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$						
#5 $Q_{2,0}^{(s,E)}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$-\frac{\sqrt{39}}{78}$	$-\frac{\sqrt{39}}{78}$	$-\frac{\sqrt{39}}{78}$	$\frac{7\sqrt{39}}{156}$	$\frac{7\sqrt{39}}{156}$
	$\frac{7\sqrt{39}}{156}$	$\frac{7\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$\frac{7\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$-\frac{5\sqrt{39}}{156}$	$\frac{7\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$
	$\frac{7\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$\frac{7\sqrt{39}}{156}$						
#6 $Q_{2,1}^{(s,E)}$	$\frac{3\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{13}$	$\frac{\sqrt{13}}{52}$	$\frac{\sqrt{13}}{52}$

continued ...

表 36

type	1	2	3	4	5	6	7	8	9	10
	$\frac{\sqrt{13}}{52}$	$\frac{\sqrt{13}}{52}$	$-\frac{3\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{52}$	$\frac{\sqrt{13}}{13}$	$-\frac{3\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{52}$	$\frac{\sqrt{13}}{13}$	$-\frac{3\sqrt{13}}{52}$	$\frac{\sqrt{13}}{13}$
	$-\frac{\sqrt{13}}{52}$	$-\frac{3\sqrt{13}}{52}$	$\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{52}$						
#7 $\mathbb{Q}_{2,0}^{(s,T_2)}$	0	0	0	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0
	0	0	0	$-\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$	0	0	0
	$-\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$						
#8 $\mathbb{Q}_{2,1}^{(s,T_2)}$	0	0	0	0	0	0	0	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$
	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$	0	$\frac{\sqrt{2}}{4}$
	0	0	$-\frac{\sqrt{2}}{4}$	0						
#9 $\mathbb{Q}_{2,2}^{(s,T_2)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0	0	0	0	0
	0	0	$\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$	0
	0	$-\frac{\sqrt{2}}{4}$	0	0						
#10 $\mathbb{Q}_{3,0}^{(s,T_1)}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	0	0	0	0	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$
	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$
	0	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0						
#11 $\mathbb{Q}_{3,1}^{(s,T_1)}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	0	0
	0	0	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$	0
	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$						
#12 $\mathbb{Q}_{3,2}^{(s,T_1)}$	0	0	0	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$
	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{10}$
	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$						
#13 $\mathbb{Q}_{3,0}^{(s,T_2)}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	0	0	0	0	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$
	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$
	0	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0						
#14 $\mathbb{Q}_{3,1}^{(s,T_2)}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	0	0

continued ...

表 36

type	1	2	3	4	5	6	7	8	9	10
	0	0	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$	0
	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$						
#15 $\mathbb{Q}_{3,2}^{(s,T_2)}$	0	0	0	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$
	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{10}$
	$\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$						
#16 $\mathbb{Q}_{4,0}^{(s,E)}$	$\frac{3\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{13}$	$-\frac{\sqrt{13}}{13}$	$\frac{\sqrt{13}}{52}$	$\frac{\sqrt{13}}{52}$
	$\frac{\sqrt{13}}{52}$	$\frac{\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$\frac{\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{13}$	$\frac{3\sqrt{13}}{52}$	$\frac{\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{13}$	$\frac{3\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{13}$
	$\frac{\sqrt{13}}{52}$	$\frac{3\sqrt{13}}{52}$	$-\frac{\sqrt{13}}{13}$	$\frac{\sqrt{13}}{52}$						
#17 $\mathbb{Q}_{4,1}^{(s,E)}$	$\frac{5\sqrt{39}}{156}$	$\frac{5\sqrt{39}}{156}$	$\frac{5\sqrt{39}}{156}$	$\frac{5\sqrt{39}}{156}$	$\frac{\sqrt{39}}{78}$	$\frac{\sqrt{39}}{78}$	$\frac{\sqrt{39}}{78}$	$\frac{\sqrt{39}}{78}$	$-\frac{7\sqrt{39}}{156}$	$-\frac{7\sqrt{39}}{156}$
	$-\frac{7\sqrt{39}}{156}$	$-\frac{7\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$\frac{7\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$-\frac{5\sqrt{39}}{156}$	$\frac{7\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$
	$\frac{7\sqrt{39}}{156}$	$-\frac{5\sqrt{39}}{156}$	$-\frac{\sqrt{39}}{78}$	$\frac{7\sqrt{39}}{156}$						
#18 $\mathbb{Q}_{4,0}^{(s,T_1)}$	0	0	0	0	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0
	0	0	0	$\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$	0	0	0
	$\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$						
#19 $\mathbb{Q}_{4,1}^{(s,T_1)}$	0	0	0	0	0	0	0	0	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$
	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$	0	$-\frac{\sqrt{2}}{4}$
	0	0	$\frac{\sqrt{2}}{4}$	0						
#20 $\mathbb{Q}_{4,2}^{(s,T_1)}$	$\frac{\sqrt{2}}{4}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{4}$	0	0	0	0	0	0
	0	0	$-\frac{\sqrt{2}}{4}$	0	0	$-\frac{\sqrt{2}}{4}$	0	0	$\frac{\sqrt{2}}{4}$	0
	0	$\frac{\sqrt{2}}{4}$	0	0						
#21 $\mathbb{Q}_{5,0}^{(s,T_1)}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	0	0	0	0	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$
	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$
	0	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	0						
#22 $\mathbb{Q}_{5,1}^{(s,T_1)}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{10}$	0	0

continued ...

表 36

type	1	2	3	4	5	6	7	8	9	10
	0	0	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{10}$	0
	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{20}$						
#23 $\mathbb{Q}_{5,2}^{(s,T_1)}$	0	0	0	0	$\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$
	$\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{10}$	0	$\frac{\sqrt{10}}{10}$	$\frac{\sqrt{10}}{20}$	0	$-\frac{\sqrt{10}}{10}$	$-\frac{\sqrt{10}}{20}$	0	$\frac{\sqrt{10}}{20}$
	$-\frac{\sqrt{10}}{10}$	0	$-\frac{\sqrt{10}}{20}$	$\frac{\sqrt{10}}{10}$						
#24 $\mathbb{Q}_6^{(s,A_2)}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$
	$\frac{\sqrt{6}}{12}$	$\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$
	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$	$-\frac{\sqrt{6}}{12}$						

No. 32 O_h $m - 3m$ [cubic] (orthonormalized)

* site positions (reduced coordinate)

$\begin{pmatrix} 3 & 2 & 1 \\ 1 & -2 & 3 \\ 1 & 3 & 2 \\ -2 & 1 & -3 \\ 1 & 2 & -3 \\ 3 & 2 & -1 \\ 3 & -1 & -2 \\ 1 & 3 & -2 \\ 2 & 1 & -3 \\ -2 & 3 & -1 \end{pmatrix}$	$\begin{pmatrix} -3 & -2 & 1 \\ -3 & 1 & 2 \\ -1 & -3 & 2 \\ -2 & -1 & 3 \\ 2 & -3 & 1 \\ -3 & 2 & 1 \\ 2 & 3 & 1 \\ -1 & 3 & 2 \\ -2 & 1 & 3 \\ -3 & -1 & 2 \end{pmatrix}$	$\begin{pmatrix} 3 & -2 & -1 \\ -2 & -3 & -1 \\ 1 & -3 & -2 \\ 2 & -1 & -3 \\ 3 & 1 & -2 \\ 3 & -2 & 1 \\ 1 & 2 & 3 \\ 1 & -3 & 2 \\ 2 & -3 & -1 \\ 1 & -2 & -3 \end{pmatrix}$	$\begin{pmatrix} -3 & 2 & -1 \\ -1 & -2 & -3 \\ -1 & 3 & -2 \\ -2 & 3 & 1 \\ -1 & 2 & 3 \\ -2 & -3 & 1 \\ 3 & 1 & 2 \\ -2 & -1 & -3 \\ -3 & 1 & -2 \end{pmatrix}$	$\begin{pmatrix} 2 & 3 & -1 \\ -3 & -1 & -2 \\ 2 & 1 & 3 \\ 3 & -1 & 2 \\ -3 & -2 & -1 \\ -1 & 2 & -3 \\ -1 & -3 & -2 \\ 2 & -1 & 3 \\ -1 & -2 & 3 \end{pmatrix}$
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* site basis

type	1	2	3	4	5	6	7	8	9	10
#1 $Q_0^{(s, A_{1g})}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$
	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$	$\frac{\sqrt{3}}{12}$
#2 $Q_{1,0}^{(s, T_{1u})}$	$\frac{3\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$
	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{3\sqrt{14}}{56}$
	$\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{56}$
	$\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$
	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$		
#3 $Q_{1,1}^{(s, T_{1u})}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{56}$

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

[illegible]

continued ...

表 37

type	1	2	3	4	5	6	7	8	9	10
	$-\frac{\sqrt{2}}{7}$	$\frac{5\sqrt{2}}{56}$	$\frac{3\sqrt{2}}{56}$	$-\frac{\sqrt{2}}{7}$	$\frac{\sqrt{2}}{7}$	$\frac{\sqrt{2}}{7}$	$\frac{\sqrt{2}}{7}$	$\frac{\sqrt{2}}{7}$	$-\frac{3\sqrt{2}}{56}$	$-\frac{3\sqrt{2}}{56}$
	$-\frac{3\sqrt{2}}{56}$	$-\frac{3\sqrt{2}}{56}$	$\frac{5\sqrt{2}}{56}$	$-\frac{\sqrt{2}}{7}$	$\frac{3\sqrt{2}}{56}$	$\frac{5\sqrt{2}}{56}$	$-\frac{\sqrt{2}}{7}$	$\frac{3\sqrt{2}}{56}$		
#42 $\mathbb{Q}_{7,0}^{(s,T_{2u},1)}$	$-\frac{1}{14}$	$\frac{1}{14}$	$-\frac{1}{14}$	$\frac{1}{14}$	$\frac{3}{28}$	$\frac{3}{14}$	$-\frac{1}{14}$	$-\frac{3}{28}$	$-\frac{3}{14}$	$-\frac{1}{14}$
	$-\frac{3}{14}$	$\frac{3}{14}$	$-\frac{3}{14}$	$\frac{3}{14}$	$-\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$\frac{1}{14}$
	$\frac{3}{14}$	$\frac{3}{28}$	$\frac{1}{14}$	$-\frac{3}{14}$	$\frac{1}{14}$	$-\frac{1}{14}$	$\frac{1}{14}$	$-\frac{1}{14}$	$-\frac{3}{28}$	$-\frac{3}{14}$
	$\frac{1}{14}$	$\frac{3}{28}$	$\frac{3}{14}$	$\frac{1}{14}$	$\frac{3}{14}$	$-\frac{3}{14}$	$\frac{3}{14}$	$-\frac{3}{14}$	$\frac{3}{28}$	$-\frac{3}{28}$
	$-\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{1}{14}$	$-\frac{3}{14}$	$-\frac{3}{28}$	$-\frac{1}{14}$	$\frac{3}{14}$		
#43 $\mathbb{Q}_{7,1}^{(s,T_{2u},1)}$	$-\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{3}{28}$	$\frac{1}{14}$	$-\frac{3}{28}$	$\frac{3}{14}$	$-\frac{1}{14}$	$-\frac{3}{28}$	$-\frac{3}{14}$
	$-\frac{1}{14}$	$\frac{1}{14}$	$\frac{1}{14}$	$-\frac{1}{14}$	$-\frac{3}{14}$	$-\frac{3}{14}$	$\frac{3}{14}$	$\frac{3}{14}$	$\frac{1}{14}$	$-\frac{3}{14}$
	$\frac{3}{28}$	$-\frac{1}{14}$	$\frac{3}{14}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$\frac{3}{28}$	$-\frac{1}{14}$	$\frac{3}{28}$
	$-\frac{3}{14}$	$\frac{1}{14}$	$\frac{3}{28}$	$\frac{3}{14}$	$\frac{1}{14}$	$-\frac{1}{14}$	$-\frac{1}{14}$	$\frac{1}{14}$	$\frac{3}{14}$	$\frac{3}{14}$
	$-\frac{3}{14}$	$-\frac{3}{14}$	$-\frac{1}{14}$	$\frac{3}{14}$	$-\frac{3}{28}$	$\frac{1}{14}$	$-\frac{3}{14}$	$-\frac{3}{28}$		
#44 $\mathbb{Q}_{7,2}^{(s,T_{2u},1)}$	$-\frac{3}{14}$	$-\frac{3}{14}$	$\frac{3}{14}$	$\frac{3}{14}$	$-\frac{3}{14}$	$\frac{1}{14}$	$\frac{3}{28}$	$-\frac{3}{14}$	$-\frac{1}{14}$	$-\frac{3}{28}$
	$-\frac{3}{28}$	$-\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{1}{14}$	$\frac{1}{14}$	$-\frac{1}{14}$	$\frac{1}{14}$	$\frac{3}{14}$	$\frac{3}{28}$
	$-\frac{1}{14}$	$\frac{3}{14}$	$-\frac{3}{28}$	$\frac{1}{14}$	$\frac{3}{14}$	$\frac{3}{14}$	$-\frac{3}{14}$	$-\frac{3}{14}$	$\frac{3}{14}$	$-\frac{1}{14}$
	$-\frac{3}{28}$	$\frac{3}{14}$	$\frac{1}{14}$	$\frac{3}{28}$	$\frac{3}{28}$	$\frac{3}{28}$	$-\frac{3}{28}$	$-\frac{3}{28}$	$\frac{1}{14}$	$-\frac{1}{14}$
	$\frac{1}{14}$	$-\frac{1}{14}$	$-\frac{3}{14}$	$-\frac{3}{28}$	$\frac{1}{14}$	$-\frac{3}{14}$	$\frac{3}{28}$	$-\frac{1}{14}$		
#45 $\mathbb{Q}_{8,0}^{(s,T_{1g},1)}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$
	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$
	$-\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{56}$
	$\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$
	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$		
#46 $\mathbb{Q}_{8,1}^{(s,T_{1g},1)}$	$-\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{28}$	$-\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$-\frac{\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{28}$	$\frac{\sqrt{14}}{56}$
	$-\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$\frac{3\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$-\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$	$-\frac{3\sqrt{14}}{56}$	$\frac{\sqrt{14}}{56}$

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表 37

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