32 Point Groups ($\omega = e^{2\pi i/3}$)

No. 1 C_1 1 [triclinic] tag = "C1"

* character table

C_1	1
A	1

* polar $\leftrightarrow$ axial conversion

A (A)

* symmetric product

	A
A	A

* anti-symmetric product

A
–

No. 2 C_i -1 [triclinic] tag = "`Ci`"

* character table

C_i	1	-1
A_g	1	1
A_u	1	-1

* polar $\leftrightarrow$ axial conversion

A_g (A_u) A_u (A_g)

* symmetric product

	A_g	A_u
A_g	A_g	A_u
A_u		A_g

* anti-symmetric product

A_g	A_u
$-$	$-$

No. 3 C_2 2 (b-axis setting) [monoclinic] tag = "C2"

* character table

C_2	1	2_{010}
A	1	1
B	1	-1

* polar $\leftrightarrow$ axial conversion

A (A) B (B)

* symmetric product

	A	B
A	A	B
B		A

* anti-symmetric product

A	B
$-$	$-$

No. 4 C_s m (b-axis setting) [monoclinic] tag = "Cs"

* character table

C_s	1	m_{010}
A'	1	1
A''	1	-1

* polar $\leftrightarrow$ axial conversion

A' (A'') A'' (A')

* symmetric product

	A'	A''
A'	A'	A''
A''		A'

* anti-symmetric product

A'	A''
$-$	$-$

No. 5 C_{2h} $2/m$ (b-axis setting) [monoclinic] tag = "C2h"

* character table

C_{2h}	1	2_{010}	-1	m_{010}
A_g	1	1	1	1
B_g	1	-1	1	-1
A_u	1	1	-1	-1
B_u	1	-1	-1	1

* polar $\leftrightarrow$ axial conversion

A_g (A_u) B_g (B_u) A_u (A_g) B_u (B_g)

* symmetric product

	A_g	B_g	A_u	B_u
A_g	A_g	B_g	A_u	B_u
B_g		A_g	B_u	A_u
A_u			A_g	B_g
B_u				A_g

* anti-symmetric product

A_g	B_g	A_u	B_u
$-$	$-$	$-$	$-$

No. 6　D_2　222　[orthorhombic] tag = "D2"

* character table

D_2	1	2_{001}	2_{010}	2_{100}
A	1	1	1	1
B_1	1	1	−1	−1
B_2	1	−1	1	−1
B_3	1	−1	−1	1

* polar ↔ axial conversion

A (A)　B_3 (B_3)　B_2 (B_2)　B_1 (B_1)

* symmetric product

	A	B_1	B_2	B_3
A	A	B_1	B_2	B_3
B_1		A	B_3	B_2
B_2			A	B_1
B_3				A

* anti-symmetric product

A	B_1	B_2	B_3
–	–	–	–

No. 7 C_{2v} $mm2$ [orthorhombic] tag = "C2v"

* character table

C_{2v}	1	2_{001}	m_{010}	m_{100}
A_1	1	1	1	1
A_2	1	1	−1	−1
B_1	1	−1	1	−1
B_2	1	−1	−1	1

* polar ↔ axial conversion

A_1 (A_2) B_2 (B_1) B_1 (B_2) A_2 (A_1)

* symmetric product

	A_1	A_2	B_1	B_2
A_1	A_1	A_2	B_1	B_2
A_2		A_1	B_2	B_1
B_1			A_1	A_2
B_2				A_1

* anti-symmetric product

A_1	A_2	B_1	B_2
–	–	–	–

No. 8 D_{2h} mmm [orthorhombic] tag = "D2h"

* character table

D_{2h}	1	2_{001}	2_{010}	2_{100}	-1	m_{001}	m_{010}	m_{100}
A_g	1	1	1	1	1	1	1	1
B_{1g}	1	1	−1	−1	1	1	−1	−1
B_{2g}	1	−1	1	−1	1	−1	1	−1
B_{3g}	1	−1	−1	1	1	−1	−1	1
A_u	1	1	1	1	−1	−1	−1	−1
B_{1u}	1	1	−1	−1	−1	−1	1	1
B_{2u}	1	−1	1	−1	−1	1	−1	1
B_{3u}	1	−1	−1	1	−1	1	1	−1

* polar ↔ axial conversion

A_g (A_u)　B_{3g} (B_{3u})　B_{2g} (B_{2u})　B_{1g} (B_{1u})　A_u (A_g)　B_{3u} (B_{3g})　B_{2u} (B_{2g})　B_{1u} (B_{1g})

* symmetric product

	A_g	B_{1g}	B_{2g}	B_{3g}	A_u	B_{1u}	B_{2u}	B_{3u}
A_g	A_g	B_{1g}	B_{2g}	B_{3g}	A_u	B_{1u}	B_{2u}	B_{3u}
B_{1g}		A_g	B_{3g}	B_{2g}	B_{1u}	A_u	B_{3u}	B_{2u}
B_{2g}			A_g	B_{1g}	B_{2u}	B_{3u}	A_u	B_{1u}
B_{3g}				A_g	B_{3u}	B_{2u}	B_{1u}	A_u
A_u					A_g	B_{1g}	B_{2g}	B_{3g}
B_{1u}						A_g	B_{3g}	B_{2g}
B_{2u}							A_g	B_{1g}
B_{3u}								A_g

* anti-symmetric product

A_g	B_{1g}	B_{2g}	B_{3g}	A_u	B_{1u}	B_{2u}	B_{3u}
–	–	–	–	–	–	–	–

No. 9 C_4 4 [tetragonal] tag = "C4"

* character table

C_4	1	2_{001}	4^+_{001}	4^-_{001}
A	1	1	1	1
B	1	1	-1	-1
$E^{(a)}$	1	-1	$-i$	i
$E^{(b)}$	1	-1	i	$-i$

* polar $\leftrightarrow$ axial conversion

$A\ (A)$ $B\ (B)$ $E^{(a)}\ (E^{(a)})$ $E^{(b)}\ (E^{(b)})$

* symmetric product

	A	B	$E^{(a)}$	$E^{(b)}$
A	A	B	$E^{(a)}$	$E^{(b)}$
B		A	$E^{(b)}$	$E^{(a)}$
$E^{(a)}$			B	A
$E^{(b)}$				B

* anti-symmetric product

A	B	$E^{(a)}$	$E^{(b)}$
$-$	$-$	$-$	$-$

No. 10　S_4　-4　[tetragonal] tag = "S4"

* character table

S_4	1	2_{001}	-4^{+}_{001}	-4^{-}_{001}
A	1	1	1	1
B	1	1	-1	-1
$E^{(a)}$	1	-1	i	$-i$
$E^{(b)}$	1	-1	$-i$	i

* polar $\leftrightarrow$ axial conversion

$A\ (B)$　$B\ (A)$　$E^{(b)}\ (E^{(a)})$　$E^{(a)}\ (E^{(b)})$

* symmetric product

	A	B	$E^{(a)}$	$E^{(b)}$
A	A	B	$E^{(a)}$	$E^{(b)}$
B		A	$E^{(b)}$	$E^{(a)}$
$E^{(a)}$			B	A
$E^{(b)}$				B

* anti-symmetric product

A	B	$E^{(a)}$	$E^{(b)}$
$-$	$-$	$-$	$-$

No. 11 C_{4h} $4/m$ [tetragonal] tag = "C4h"

* character table

C_{4h}	1	2_{001}	4^+_{001}	4^-_{001}	-1	m_{001}	-4^+_{001}	-4^-_{001}
A_g	1	1	1	1	1	1	1	1
B_g	1	1	-1	-1	1	1	-1	-1
$E_g^{(a)}$	1	-1	$-i$	i	1	-1	$-i$	i
$E_g^{(b)}$	1	-1	i	$-i$	1	-1	i	$-i$
A_u	1	1	1	1	-1	-1	-1	-1
B_u	1	1	-1	-1	-1	-1	1	1
$E_u^{(a)}$	1	-1	$-i$	i	-1	1	i	$-i$
$E_u^{(b)}$	1	-1	i	$-i$	-1	1	$-i$	i

* polar $\leftrightarrow$ axial conversion

A_g (A_u) B_g (B_u) $E_g^{(a)}$ ($E_u^{(a)}$) $E_g^{(b)}$ ($E_u^{(b)}$) A_u (A_g) B_u (B_g) $E_u^{(a)}$ ($E_g^{(a)}$) $E_u^{(b)}$ ($E_g^{(b)}$)

* symmetric product

	A_g	B_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	B_u	$E_u^{(a)}$	$E_u^{(b)}$
A_g	A_g	B_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	B_u	$E_u^{(a)}$	$E_u^{(b)}$
B_g		A_g	$E_g^{(b)}$	$E_g^{(a)}$	B_u	A_u	$E_u^{(b)}$	$E_u^{(a)}$
$E_g^{(a)}$			B_g	A_g	$E_u^{(a)}$	$E_u^{(b)}$	B_u	A_u
$E_g^{(b)}$				B_g	$E_u^{(b)}$	$E_u^{(a)}$	A_u	B_u
A_u					A_g	B_g	$E_g^{(a)}$	$E_g^{(b)}$
B_u						A_g	$E_g^{(b)}$	$E_g^{(a)}$
$E_u^{(a)}$							B_g	A_g
$E_u^{(b)}$								B_g

* anti-symmetric product

A_g	B_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	B_u	$E_u^{(a)}$	$E_u^{(b)}$
–	–	–	–	–	–	–	–

No. 12　D_4　422　[tetragonal] tag = "D4"

* character table

D_4	1	2_{001}	2_{100}	2_{110}	4^+_{001}
A_1	1	1	1	1	1
A_2	1	1	−1	−1	1
B_1	1	1	1	−1	−1
B_2	1	1	−1	1	−1
E	2	−2	0	0	0

* polar ↔ axial conversion

A_1 (A_1)　B_1 (B_1)　E (E)　A_2 (A_2)　B_2 (B_2)

* symmetric product

	A_1	A_2	B_1	B_2	E
A_1	A_1	A_2	B_1	B_2	E
A_2		A_1	B_2	B_1	E
B_1			A_1	A_2	E
B_2				A_1	E
E					$A_1 + B_1 + B_2$

* anti-symmetric product

A_1	A_2	B_1	B_2	E
–	–	–	–	A_2

No. 13 C_{4v} $4mm$ [tetragonal] tag = "C4v"

* character table

C_{4v}	1	2_{001}	4^{+}_{001}	m_{100}	m_{110}
A_1	1	1	1	1	1
A_2	1	1	1	−1	−1
B_1	1	1	−1	1	−1
B_2	1	1	−1	−1	1
E	2	−2	0	0	0

* polar ↔ axial conversion

A_1 (A_2) B_1 (B_2) E (E) A_2 (A_1) B_2 (B_1)

* symmetric product

	A_1	A_2	B_1	B_2	E
A_1	A_1	A_2	B_1	B_2	E
A_2		A_1	B_2	B_1	E
B_1			A_1	A_2	E
B_2				A_1	E
E					$A_1 + B_1 + B_2$

* anti-symmetric product

A_1	A_2	B_1	B_2	E
–	–	–	–	A_2

No. 14 D_{2d} $-42m$ (-42m setting) [tetragonal] tag = "D2d"

* character table

D_{2d}	1	2_{001}	2_{100}	m_{110}	-4^{+}_{001}
A_1	1	1	1	1	1
A_2	1	1	−1	−1	1
B_1	1	1	1	−1	−1
B_2	1	1	−1	1	−1
E	2	−2	0	0	0

* polar ↔ axial conversion

A_1 (B_1) B_1 (A_1) E (E) A_2 (B_2) B_2 (A_2)

* symmetric product

	A_1	A_2	B_1	B_2	E
A_1	A_1	A_2	B_1	B_2	E
A_2		A_1	B_2	B_1	E
B_1			A_1	A_2	E
B_2				A_1	E
E					$A_1 + B_1 + B_2$

* anti-symmetric product

A_1	A_2	B_1	B_2	E
–	–	–	–	A_2

No. 14　$D_{2d}-1$　$-4m2$　(-4m2 setting)　[tetragonal] tag = "D2d-1"

* character table

$D_{2d}-1$	1	2_{001}	2_{110}	m_{100}	-4^{+}_{001}
A_1	1	1	1	1	1
A_2	1	1	−1	−1	1
B_1	1	1	1	−1	−1
B_2	1	1	−1	1	−1
E	2	−2	0	0	0

* polar ↔ axial conversion

A_1 (B_1)　B_2 (A_2)　E (E)　A_2 (B_2)　B_1 (A_1)

* symmetric product

	A_1	A_2	B_1	B_2	E
A_1	A_1	A_2	B_1	B_2	E
A_2		A_1	B_2	B_1	E
B_1			A_1	A_2	E
B_2				A_1	E
E					$A_1+B_1+B_2$

* anti-symmetric product

A_1	A_2	B_1	B_2	E
−	−	−	−	A_2

No. 15 D_{4h} $4/mmm$ [tetragonal] tag = "D4h"

* character table

D_{4h}	1	2_{001}	2_{100}	2_{110}	4^+_{001}	-1	m_{001}	m_{100}	m_{110}	-4^+_{001}
A_{1g}	1	1	1	1	1	1	1	1	1	1
A_{2g}	1	1	-1	-1	1	1	1	-1	-1	1
B_{1g}	1	1	1	-1	-1	1	1	1	-1	-1
B_{2g}	1	1	-1	1	-1	1	1	-1	1	-1
E_g	2	-2	0	0	0	2	-2	0	0	0
A_{1u}	1	1	1	1	1	-1	-1	-1	-1	-1
A_{2u}	1	1	-1	-1	1	-1	-1	1	1	-1
B_{1u}	1	1	1	-1	-1	-1	-1	-1	1	1
B_{2u}	1	1	-1	1	-1	-1	-1	1	-1	1
E_u	2	-2	0	0	0	-2	2	0	0	0

* polar $\leftrightarrow$ axial conversion

A_{1g} (A_{1u}) B_{1g} (B_{1u}) E_g (E_u) A_{2g} (A_{2u}) B_{2g} (B_{2u}) A_{1u} (A_{1g}) B_{1u} (B_{1g}) E_u (E_g) A_{2u} (A_{2g}) B_{2u} (B_{2g})

* symmetric product

	A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_g	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_u
A_{1g}	A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_g	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_u
A_{2g}		A_{1g}	B_{2g}	B_{1g}	E_g	A_{2u}	A_{1u}	B_{2u}	B_{1u}	E_u
B_{1g}			A_{1g}	A_{2g}	E_g	B_{1u}	B_{2u}	A_{1u}	A_{2u}	E_u
B_{2g}				A_{1g}	E_g	B_{2u}	B_{1u}	A_{2u}	A_{1u}	E_u
E_g					$A_{1g} + B_{1g} + B_{2g}$	E_u	E_u	E_u	E_u	$A_{1u} + A_{2u} + B_{1u} + B_{2u}$
A_{1u}						A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_g
A_{2u}							A_{1g}	B_{2g}	B_{1g}	E_g
B_{1u}								A_{1g}	A_{2g}	E_g
B_{2u}									A_{1g}	E_g
E_u										$A_{1g} + B_{1g} + B_{2g}$

* anti-symmetric product

A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_g	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_u
–	–	–	–	A_{2g}	–	–	–	–	A_{2g}

No. 16　C_3　3　[trigonal] tag = "C3"

* character table

C_3	1	3^+_{001}	3^-_{001}
A	1	1	1
$E^{(a)}$	1	ω^*	ω
$E^{(b)}$	1	ω	ω^*

* polar $\leftrightarrow$ axial conversion

A (A)　$E^{(a)}$ $(E^{(a)})$　$E^{(b)}$ $(E^{(b)})$

* symmetric product

	A	$E^{(a)}$	$E^{(b)}$
A	A	$E^{(a)}$	$E^{(b)}$
$E^{(a)}$		$E^{(b)}$	A
$E^{(b)}$			$E^{(a)}$

* anti-symmetric product

A	$E^{(a)}$	$E^{(b)}$
–	–	–

No. 17　C_{3i}　-3　[trigonal] tag = "C3i"

* character table

C_{3i}	1	3^+_{001}	3^-_{001}	-1	-3^+_{001}	-3^-_{001}
A_g	1	1	1	1	1	1
$E_g^{(a)}$	1	ω^*	ω	1	ω^*	ω
$E_g^{(b)}$	1	ω	ω^*	1	ω	ω^*
A_u	1	1	1	-1	-1	-1
$E_u^{(a)}$	1	ω^*	ω	-1	$-\omega^*$	$-\omega$
$E_u^{(b)}$	1	ω	ω^*	-1	$-\omega$	$-\omega^*$

* polar $\leftrightarrow$ axial conversion

A_g (A_u)　$E_g^{(a)}$ $(E_u^{(a)})$　$E_g^{(b)}$ $(E_u^{(b)})$　A_u (A_g)　$E_u^{(a)}$ $(E_g^{(a)})$　$E_u^{(b)}$ $(E_g^{(b)})$

* symmetric product

	A_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	$E_u^{(a)}$	$E_u^{(b)}$
A_g	A_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	$E_u^{(a)}$	$E_u^{(b)}$
$E_g^{(a)}$		$E_g^{(b)}$	A_g	$E_u^{(a)}$	$E_u^{(b)}$	A_u
$E_g^{(b)}$			$E_g^{(a)}$	$E_u^{(b)}$	A_u	$E_u^{(a)}$
A_u				A_g	$E_g^{(a)}$	$E_g^{(b)}$
$E_u^{(a)}$					$E_g^{(b)}$	A_g
$E_u^{(b)}$						$E_g^{(a)}$

* anti-symmetric product

A_g	$E_g^{(a)}$	$E_g^{(b)}$	A_u	$E_u^{(a)}$	$E_u^{(b)}$
–	–	–	–	–	–

No. 18 D_3 312 (312 setting) [trigonal] tag = "D3"

* character table

D_3	1	2_{120}	3^+_{001}
A_1	1	1	1
A_2	1	-1	1
E	2	0	-1

* polar $\leftrightarrow$ axial conversion

A_1 (A_1) A_2 (A_2) E (E)

* symmetric product

	A_1	A_2	E
A_1	A_1	A_2	E
A_2		A_1	E
E			$A_1 + E$

* anti-symmetric product

A_1	A_2	E
$-$	$-$	A_2

No. 18　D_3-1　321　(321 setting)　[trigonal] tag = "D3-1"

* character table

D_3-1	1	2_{100}	3^+_{001}
A_1	1	1	1
A_2	1	−1	1
E	2	0	−1

* polar ↔ axial conversion

A_1 (A_1)　A_2 (A_2)　E (E)

* symmetric product

	A_1	A_2	E
A_1	A_1	A_2	E
A_2		A_1	E
E			A_1+E

* anti-symmetric product

A_1	A_2	E
−	−	A_2

No. 19 C_{3v} $3m1$ (3m1 setting) [trigonal] tag = "C3v"

* character table

C_{3v}	1	3^{+}_{001}	m_{100}
A_1	1	1	1
A_2	1	1	-1
E	2	-1	0

* polar $\leftrightarrow$ axial conversion

A_1 (A_2) A_2 (A_1) E (E)

* symmetric product

	A_1	A_2	E
A_1	A_1	A_2	E
A_2		A_1	E
E			$A_1 + E$

* anti-symmetric product

A_1	A_2	E
$-$	$-$	A_2

No. 19　$C_{3v}-1$　$31m$　(31m setting)　[trigonal] tag = "C3v-1"

* character table

$C_{3v}-1$	1	3^{+}_{001}	m_{120}
A_1	1	1	1
A_2	1	1	-1
E	2	-1	0

* polar $\leftrightarrow$ axial conversion

A_1 (A_2)　A_2 (A_1)　E (E)

* symmetric product

	A_1	A_2	E
A_1	A_1	A_2	E
A_2		A_1	E
E			A_1+E

* anti-symmetric product

A_1	A_2	E
$-$	$-$	A_2

No. 20 D_{3d} $-31m$ (-31m setting) [trigonal] tag = "D3d"

* character table

D_{3d}	1	2_{120}	3^+_{001}	-1	m_{120}	-3^+_{001}
A_{1g}	1	1	1	1	1	1
A_{2g}	1	-1	1	1	-1	1
E_g	2	0	-1	2	0	-1
A_{1u}	1	1	1	-1	-1	-1
A_{2u}	1	-1	1	-1	1	-1
E_u	2	0	-1	-2	0	1

* polar $\leftrightarrow$ axial conversion

A_{1g} (A_{1u}) A_{2g} (A_{2u}) E_g (E_u) A_{1u} (A_{1g}) A_{2u} (A_{2g}) E_u (E_g)

* symmetric product

	A_{1g}	A_{2g}	E_g	A_{1u}	A_{2u}	E_u
A_{1g}	A_{1g}	A_{2g}	E_g	A_{1u}	A_{2u}	E_u
A_{2g}		A_{1g}	E_g	A_{2u}	A_{1u}	E_u
E_g			$A_{1g}+E_g$	E_u	E_u	$A_{1u}+A_{2u}+E_u$
A_{1u}				A_{1g}	A_{2g}	E_g
A_{2u}					A_{1g}	E_g
E_u						$A_{1g}+E_g$

* anti-symmetric product

A_{1g}	A_{2g}	E_g	A_{1u}	A_{2u}	E_u
$-$	$-$	A_{2g}	$-$	$-$	A_{2g}

No. 20　$D_{3d}-1$　$-3m1$　(-3m1 setting)　[trigonal] tag = "D3d-1"

* character table

$D_{3d}-1$	1	2_{100}	3^+_{001}	-1	m_{100}	-3^+_{001}
A_{1g}	1	1	1	1	1	1
A_{2g}	1	-1	1	1	-1	1
E_g	2	0	-1	2	0	-1
A_{1u}	1	1	1	-1	-1	-1
A_{2u}	1	-1	1	-1	1	-1
E_u	2	0	-1	-2	0	1

* polar $\leftrightarrow$ axial conversion

A_{1g} (A_{1u})　A_{2g} (A_{2u})　E_g (E_u)　A_{1u} (A_{1g})　A_{2u} (A_{2g})　E_u (E_g)

* symmetric product

	A_{1g}	A_{2g}	E_g	A_{1u}	A_{2u}	E_u
A_{1g}	A_{1g}	A_{2g}	E_g	A_{1u}	A_{2u}	E_u
A_{2g}		A_{1g}	E_g	A_{2u}	A_{1u}	E_u
E_g			$A_{1g}+E_g$	E_u	E_u	$A_{1u}+A_{2u}+E_u$
A_{1u}				A_{1g}	A_{2g}	E_g
A_{2u}					A_{1g}	E_g
E_u						$A_{1g}+E_g$

* anti-symmetric product

A_{1g}	A_{2g}	E_g	A_{1u}	A_{2u}	E_u
$-$	$-$	A_{2g}	$-$	$-$	A_{2g}

No. 21 C_6 6 [hexagonal] tag = "C6"

* character table

C_6	1	2_{001}	3^+_{001}	3^-_{001}	6^+_{001}	6^-_{001}
A	1	1	1	1	1	1
B	1	-1	1	1	-1	-1
$E_1^{(a)}$	1	-1	ω^*	ω	$-\omega$	$-\omega^*$
$E_1^{(b)}$	1	-1	ω	ω^*	$-\omega^*$	$-\omega$
$E_2^{(a)}$	1	1	ω^*	ω	ω	ω^*
$E_2^{(b)}$	1	1	ω	ω^*	ω^*	ω

* polar $\leftrightarrow$ axial conversion

A (A) $\quad B$ (B) $\quad E_1^{(a)}$ $(E_1^{(a)})$ $\quad E_1^{(b)}$ $(E_1^{(b)})$ $\quad E_2^{(a)}$ $(E_2^{(a)})$ $\quad E_2^{(b)}$ $(E_2^{(b)})$

* symmetric product

	A	B	$E_1^{(a)}$	$E_1^{(b)}$	$E_2^{(a)}$	$E_2^{(b)}$
A	A	B	$E_1^{(a)}$	$E_1^{(b)}$	$E_2^{(a)}$	$E_2^{(b)}$
B		A	$E_2^{(a)}$	$E_2^{(b)}$	$E_1^{(a)}$	$E_1^{(b)}$
$E_1^{(a)}$			$E_2^{(b)}$	A	$E_1^{(b)}$	B
$E_1^{(b)}$				$E_2^{(a)}$	B	$E_1^{(a)}$
$E_2^{(a)}$					$E_2^{(b)}$	A
$E_2^{(b)}$						$E_2^{(a)}$

* anti-symmetric product

A	B	$E_1^{(a)}$	$E_1^{(b)}$	$E_2^{(a)}$	$E_2^{(b)}$
–	–	–	–	–	–

No. 22　C_{3h}　-6　[hexagonal] tag = "C3h"

* character table

C_{3h}	1	3^+_{001}	3^-_{001}	m_{001}	-6^+_{001}	-6^-_{001}
A'	1	1	1	1	1	1
A''	1	1	1	-1	-1	-1
$E'^{(a)}$	1	ω^*	ω	1	ω	ω^*
$E'^{(b)}$	1	ω	ω^*	1	ω^*	ω
$E''^{(a)}$	1	ω^*	ω	-1	$-\omega$	$-\omega^*$
$E''^{(b)}$	1	ω	ω^*	-1	$-\omega^*$	$-\omega$

* polar $\leftrightarrow$ axial conversion

A' (A'')　A'' (A')　$E''^{(a)}$ $(E'^{(a)})$　$E''^{(b)}$ $(E'^{(b)})$　$E'^{(a)}$ $(E''^{(a)})$　$E'^{(b)}$ $(E''^{(b)})$

* symmetric product

	A'	A''	$E'^{(a)}$	$E'^{(b)}$	$E''^{(a)}$	$E''^{(b)}$
A'	A'	A''	$E'^{(a)}$	$E'^{(b)}$	$E''^{(a)}$	$E''^{(b)}$
A''		A'	$E''^{(a)}$	$E''^{(b)}$	$E'^{(a)}$	$E'^{(b)}$
$E'^{(a)}$			$E'^{(b)}$	A'	$E''^{(b)}$	A''
$E'^{(b)}$				$E'^{(a)}$	A''	$E''^{(a)}$
$E''^{(a)}$					$E'^{(b)}$	A'
$E''^{(b)}$						$E'^{(a)}$

* anti-symmetric product

A'	A''	$E'^{(a)}$	$E'^{(b)}$	$E''^{(a)}$	$E''^{(b)}$
$-$	$-$	$-$	$-$	$-$	$-$

No. 23 C_{6h} $6/m$ [hexagonal] tag = "C6h"

* character table

C_{6h}	1	2_{001}	3^+_{001}	3^-_{001}	6^+_{001}	6^-_{001}	-1	m_{001}	-3^+_{001}	-3^-_{001}	-6^+_{001}	-6^-_{001}
A_g	1	1	1	1	1	1	1	1	1	1	1	1
B_g	1	-1	1	1	-1	-1	1	-1	1	1	-1	-1
$E^{(a)}_{1g}$	1	-1	ω^*	ω	$-\omega$	$-\omega^*$	1	-1	ω^*	ω	$-\omega$	$-\omega^*$
$E^{(b)}_{1g}$	1	-1	ω	ω^*	$-\omega^*$	$-\omega$	1	-1	ω	ω^*	$-\omega^*$	$-\omega$
$E^{(a)}_{2g}$	1	1	ω^*	ω	ω	ω^*	1	1	ω^*	ω	ω	ω^*
$E^{(b)}_{2g}$	1	1	ω	ω^*	ω^*	ω	1	1	ω	ω^*	ω^*	ω
A_u	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1
B_u	1	-1	1	1	-1	-1	-1	1	-1	-1	1	1
$E^{(a)}_{1u}$	1	-1	ω^*	ω	$-\omega$	$-\omega^*$	-1	1	$-\omega^*$	$-\omega$	ω	ω^*
$E^{(b)}_{1u}$	1	-1	ω	ω^*	$-\omega^*$	$-\omega$	-1	1	$-\omega$	$-\omega^*$	ω^*	ω
$E^{(a)}_{2u}$	1	1	ω^*	ω	ω	ω^*	-1	-1	$-\omega^*$	$-\omega$	$-\omega$	$-\omega^*$
$E^{(b)}_{2u}$	1	1	ω	ω^*	ω^*	ω	-1	-1	$-\omega$	$-\omega^*$	$-\omega^*$	$-\omega$

* polar $\leftrightarrow$ axial conversion

A_g (A_u) B_g (B_u) $E^{(a)}_{1g}$ ($E^{(a)}_{1u}$) $E^{(b)}_{1g}$ ($E^{(b)}_{1u}$) $E^{(a)}_{2g}$ ($E^{(a)}_{2u}$) $E^{(b)}_{2g}$ ($E^{(b)}_{2u}$) A_u (A_g) B_u (B_g) $E^{(a)}_{1u}$ ($E^{(a)}_{1g}$) $E^{(b)}_{1u}$ ($E^{(b)}_{1g}$) $E^{(a)}_{2u}$ ($E^{(a)}_{2g}$) $E^{(b)}_{2u}$ ($E^{(b)}_{2g}$)

* symmetric product

	A_g	B_g	$E_{1g}^{(a)}$	$E_{1g}^{(b)}$	$E_{2g}^{(a)}$	$E_{2g}^{(b)}$	A_u	B_u	$E_{1u}^{(a)}$	$E_{1u}^{(b)}$	$E_{2u}^{(a)}$	$E_{2u}^{(b)}$
A_g	A_g	B_g	$E_{1g}^{(a)}$	$E_{1g}^{(b)}$	$E_{2g}^{(a)}$	$E_{2g}^{(b)}$	A_u	B_u	$E_{1u}^{(a)}$	$E_{1u}^{(b)}$	$E_{2u}^{(a)}$	$E_{2u}^{(b)}$
B_g		A_g	$E_{2g}^{(a)}$	$E_{2g}^{(b)}$	$E_{1g}^{(a)}$	$E_{1g}^{(b)}$	B_u	A_u	$E_{2u}^{(a)}$	$E_{2u}^{(b)}$	$E_{1u}^{(a)}$	$E_{1u}^{(b)}$
$E_{1g}^{(a)}$			$E_{2g}^{(b)}$	A_g	$E_{1g}^{(b)}$	B_g	$E_{1u}^{(a)}$	$E_{2u}^{(a)}$	$E_{2u}^{(b)}$	A_u	$E_{1u}^{(b)}$	B_u
$E_{1g}^{(b)}$				$E_{2g}^{(a)}$	B_g	$E_{1g}^{(a)}$	$E_{1u}^{(b)}$	$E_{2u}^{(b)}$	A_u	$E_{2u}^{(a)}$	B_u	$E_{1u}^{(a)}$
$E_{2g}^{(a)}$					$E_{2g}^{(b)}$	A_g	$E_{2u}^{(a)}$	$E_{1u}^{(a)}$	$E_{1u}^{(b)}$	B_u	$E_{2u}^{(b)}$	A_u
$E_{2g}^{(b)}$						$E_{2g}^{(a)}$	$E_{2u}^{(b)}$	$E_{1u}^{(b)}$	B_u	$E_{1u}^{(a)}$	A_u	$E_{2u}^{(a)}$
A_u							A_g	B_g	$E_{1g}^{(a)}$	$E_{1g}^{(b)}$	$E_{2g}^{(a)}$	$E_{2g}^{(b)}$
B_u								A_g	$E_{2g}^{(a)}$	$E_{2g}^{(b)}$	$E_{1g}^{(a)}$	$E_{1g}^{(b)}$
$E_{1u}^{(a)}$									$E_{2g}^{(b)}$	A_g	$E_{1g}^{(b)}$	B_g
$E_{1u}^{(b)}$										$E_{2g}^{(a)}$	B_g	$E_{1g}^{(a)}$
$E_{2u}^{(a)}$											$E_{2g}^{(b)}$	A_g
$E_{2u}^{(b)}$												$E_{2g}^{(a)}$

* anti-symmetric product

A_g	B_g	$E_{1g}^{(a)}$	$E_{1g}^{(b)}$	$E_{2g}^{(a)}$	$E_{2g}^{(b)}$	A_u	B_u	$E_{1u}^{(a)}$	$E_{1u}^{(b)}$	$E_{2u}^{(a)}$	$E_{2u}^{(b)}$
–	–	–	–	–	–	–	–	–	–	–	–

No. 24　D_6　622　[hexagonal] tag = "D6"

* character table

D_6	1	2_{001}	2_{100}	2_{120}	3^+_{001}	6^+_{001}
A_1	1	1	1	1	1	1
A_2	1	1	−1	−1	1	1
B_1	1	−1	−1	1	1	−1
B_2	1	−1	1	−1	1	−1
E_1	2	−2	0	0	−1	1
E_2	2	2	0	0	−1	−1

* polar ↔ axial conversion

A_1 (A_1)　A_2 (A_2)　B_1 (B_1)　B_2 (B_2)　E_1 (E_1)　E_2 (E_2)

* symmetric product

	A_1	A_2	B_1	B_2	E_1	E_2
A_1	A_1	A_2	B_1	B_2	E_1	E_2
A_2		A_1	B_2	B_1	E_1	E_2
B_1			A_1	A_2	E_2	E_1
B_2				A_1	E_2	E_1
E_1					$A_1 + E_2$	$B_1 + B_2 + E_1$
E_2						$A_1 + E_2$

* anti-symmetric product

A_1	A_2	B_1	B_2	E_1	E_2
−	−	−	−	A_2	A_2

No. 25 C_{6v} $6mm$ [hexagonal] tag = "C6v"

* character table

C_{6v}	1	2_{001}	3^+_{001}	6^+_{001}	m_{100}	m_{120}
A_1	1	1	1	1	1	1
A_2	1	1	1	1	−1	−1
B_1	1	−1	1	−1	1	−1
B_2	1	−1	1	−1	−1	1
E_1	2	−2	−1	1	0	0
E_2	2	2	−1	−1	0	0

* polar ↔ axial conversion

A_1 (A_2)　A_2 (A_1)　B_2 (B_1)　B_1 (B_2)　E_1 (E_1)　E_2 (E_2)

* symmetric product

	A_1	A_2	B_1	B_2	E_1	E_2
A_1	A_1	A_2	B_1	B_2	E_1	E_2
A_2		A_1	B_2	B_1	E_1	E_2
B_1			A_1	A_2	E_2	E_1
B_2				A_1	E_2	E_1
E_1					$A_1 + E_2$	$B_1 + B_2 + E_1$
E_2						$A_1 + E_2$

* anti-symmetric product

A_1	A_2	B_1	B_2	E_1	E_2
−	−	−	−	A_2	A_2

No. 26 D_{3h} $-6m2$ (-6m2 setting) [hexagonal] tag = "D3h"

* character table

D_{3h}	1	2_{120}	3^+_{001}	m_{100}	m_{001}	-6^+_{001}
A'_1	1	1	1	1	1	1
A'_2	1	−1	1	−1	1	1
A''_1	1	1	1	−1	−1	−1
A''_2	1	−1	1	1	−1	−1
E'	2	0	−1	0	2	−1
E''	2	0	−1	0	−2	1

* polar ↔ axial conversion

A'_1 (A''_1) A'_2 (A''_2) A''_1 (A'_1) A''_2 (A'_2) E'' (E') E' (E'')

* symmetric product

	A'_1	A'_2	A''_1	A''_2	E'	E''
A'_1	A'_1	A'_2	A''_1	A''_2	E'	E''
A'_2		A'_1	A''_2	A''_1	E'	E''
A''_1			A'_1	A'_2	E''	E'
A''_2				A'_1	E''	E'
E'					$A'_1 + E'$	$A''_1 + A''_2 + E''$
E''						$A'_1 + E'$

* anti-symmetric product

A'_1	A'_2	A''_1	A''_2	E'	E''
−	−	−	−	A'_2	A'_2

No. 26 $D_{3h}-1$ $-62m$ (-62m setting) [hexagonal] tag = "D3h-1"

* character table

$D_{3h}-1$	1	2_{100}	3^+_{001}	m_{001}	m_{120}	-6^+_{001}
A'_1	1	1	1	1	1	1
A'_2	1	−1	1	1	−1	1
A''_1	1	1	1	−1	−1	−1
A''_2	1	−1	1	−1	1	−1
E'	2	0	−1	2	0	−1
E''	2	0	−1	−2	0	1

* polar ↔ axial conversion

A'_1 (A''_1) A'_2 (A''_2) A''_2 (A'_2) A''_1 (A'_1) E'' (E') E' (E'')

* symmetric product

	A'_1	A'_2	A''_1	A''_2	E'	E''
A'_1	A'_1	A'_2	A''_1	A''_2	E'	E''
A'_2		A'_1	A''_2	A''_1	E'	E''
A''_1			A'_1	A'_2	E''	E'
A''_2				A'_1	E''	E'
E'					A'_1+E'	$A''_1+A''_2+E''$
E''						A'_1+E'

* anti-symmetric product

A'_1	A'_2	A''_1	A''_2	E'	E''
−	−	−	−	A'_2	A'_2

No. 27 D_{6h} $6/mmm$ [hexagonal] tag = "D6h"

* character table

D_{6h}	1	2_{001}	2_{100}	2_{120}	3^+_{001}	6^+_{001}	-1	m_{100}	m_{001}	m_{120}	-3^+_{001}	-6^+_{001}
A_{1g}	1	1	1	1	1	1	1	1	1	1	1	1
A_{2g}	1	1	−1	−1	1	1	1	−1	1	−1	1	1
B_{1g}	1	−1	−1	1	1	−1	1	−1	−1	1	1	−1
B_{2g}	1	−1	1	−1	1	−1	1	1	−1	−1	1	−1
E_{1g}	2	−2	0	0	−1	1	2	0	−2	0	−1	1
E_{2g}	2	2	0	0	−1	−1	2	0	2	0	−1	−1
A_{1u}	1	1	1	1	1	1	−1	−1	−1	−1	−1	−1
A_{2u}	1	1	−1	−1	1	1	−1	1	−1	1	−1	−1
B_{1u}	1	−1	−1	1	1	−1	−1	1	1	−1	−1	1
B_{2u}	1	−1	1	−1	1	−1	−1	−1	1	1	−1	1
E_{1u}	2	−2	0	0	−1	1	−2	0	2	0	1	−1
E_{2u}	2	2	0	0	−1	−1	−2	0	−2	0	1	1

* polar ↔ axial conversion

A_{1g} (A_{1u}) A_{2g} (A_{2u}) B_{1g} (B_{1u}) B_{2g} (B_{2u}) E_{1g} (E_{1u}) E_{2g} (E_{2u}) A_{1u} (A_{1g}) A_{2u} (A_{2g}) B_{1u} (B_{1g}) B_{2u} (B_{2g}) E_{1u} (E_{1g}) E_{2u} (E_{2g})

* symmetric product

	A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_{1u}	E_{2u}
A_{1g}	A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_{1u}	E_{2u}
A_{2g}		A_{1g}	B_{2g}	B_{1g}	E_{1g}	E_{2g}	A_{2u}	A_{1u}	B_{2u}	B_{1u}	E_{1u}	E_{2u}
B_{1g}			A_{1g}	A_{2g}	E_{2g}	E_{1g}	B_{1u}	B_{2u}	A_{1u}	A_{2u}	E_{2u}	E_{1u}
B_{2g}				A_{1g}	E_{2g}	E_{1g}	B_{2u}	B_{1u}	A_{2u}	A_{1u}	E_{2u}	E_{1u}
E_{1g}					$A_{1g} + E_{2g}$	$B_{1g} + B_{2g} + E_{1g}$	E_{1u}	E_{1u}	E_{2u}	E_{2u}	$A_{1u} + A_{2u} + E_{2u}$	$B_{1u} + B_{2u} + E_{1u}$
E_{2g}						$A_{1g} + E_{2g}$	E_{2u}	E_{2u}	E_{1u}	E_{1u}	$B_{1u} + B_{2u} + E_{1u}$	$A_{1u} + A_{2u} + E_{2u}$
A_{1u}							A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}
A_{2u}								A_{1g}	B_{2g}	B_{1g}	E_{1g}	E_{2g}
B_{1u}									A_{1g}	A_{2g}	E_{2g}	E_{1g}
B_{2u}										A_{1g}	E_{2g}	E_{1g}
E_{1u}											$A_{1g} + E_{2g}$	$B_{1g} + B_{2g} + E_{1g}$
E_{2u}												$A_{1g} + E_{2g}$

* anti-symmetric product

A_{1g}	A_{2g}	B_{1g}	B_{2g}	E_{1g}	E_{2g}	A_{1u}	A_{2u}	B_{1u}	B_{2u}	E_{1u}	E_{2u}
–	–	–	–	A_{2g}	A_{2g}	–	–	–	–	A_{2g}	A_{2g}

No. 28 T 23 [cubic] tag = "T"

* character table

T	1	2_{001}	3^{+}_{111}	3^{-}_{111}
A	1	1	1	1
$E^{(a)}$	1	1	ω^*	ω
$E^{(b)}$	1	1	ω	ω^*
T	3	-1	0	0

* polar $\leftrightarrow$ axial conversion

$A\ (A)$ $E^{(a)}\ (E^{(a)})$ $E^{(b)}\ (E^{(b)})$ $T\ (T)$

* symmetric product

	A	$E^{(a)}$	$E^{(b)}$	T
A	A	$E^{(a)}$	$E^{(b)}$	T
$E^{(a)}$		$E^{(b)}$	A	T
$E^{(b)}$			$E^{(a)}$	T
T				$A + E^{(a)} + E^{(b)} + T$

* anti-symmetric product

A	$E^{(a)}$	$E^{(b)}$	T
$-$	$-$	$-$	T

No. 29 T_h $m-3$ [cubic] tag = "Th"

* character table

T_h	1	2_{001}	3^+_{111}	3^-_{111}	-1	m_{001}	-3^+_{111}	-3^-_{111}
A_g	1	1	1	1	1	1	1	1
$E_g^{(a)}$	1	1	ω^*	ω	1	1	ω^*	ω
$E_g^{(b)}$	1	1	ω	ω^*	1	1	ω	ω^*
T_g	3	-1	0	0	3	-1	0	0
A_u	1	1	1	1	-1	-1	-1	-1
$E_u^{(a)}$	1	1	ω^*	ω	-1	-1	$-\omega^*$	$-\omega$
$E_u^{(b)}$	1	1	ω	ω^*	-1	-1	$-\omega$	$-\omega^*$
T_u	3	-1	0	0	-3	1	0	0

* polar $\leftrightarrow$ axial conversion

A_g (A_u) $\quad E_g^{(a)}$ $(E_u^{(a)})$ $\quad E_g^{(b)}$ $(E_u^{(b)})$ $\quad T_g$ (T_u) $\quad A_u$ (A_g) $\quad E_u^{(a)}$ $(E_g^{(a)})$ $\quad E_u^{(b)}$ $(E_g^{(b)})$ $\quad T_u$ (T_g)

* symmetric product

	A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g	A_u	$E_u^{(a)}$	$E_u^{(b)}$	T_u
A_g	A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g	A_u	$E_u^{(a)}$	$E_u^{(b)}$	T_u
$E_g^{(a)}$		$E_g^{(b)}$	A_g	T_g	$E_u^{(a)}$	$E_u^{(b)}$	A_u	T_u
$E_g^{(b)}$			$E_g^{(a)}$	T_g	$E_u^{(b)}$	A_u	$E_u^{(a)}$	T_u
T_g				$A_g + E_g^{(a)} + E_g^{(b)} + T_g$	T_u	T_u	T_u	$A_u + E_u^{(a)} + E_u^{(b)} + 2T_u$
A_u					A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g
$E_u^{(a)}$						$E_g^{(b)}$	A_g	T_g
$E_u^{(b)}$							$E_g^{(a)}$	T_g
T_u								$A_g + E_g^{(a)} + E_g^{(b)} + T_g$

* anti-symmetric product

A_g	$E_g^{(a)}$	$E_g^{(b)}$	T_g	A_u	$E_u^{(a)}$	$E_u^{(b)}$	T_u
$-$	$-$	$-$	T_g	$-$	$-$	$-$	T_g

No. 30　O　432　[cubic] tag = "0"

* character table

O	1	2_{001}	2_{110}	3^{+}_{111}	4^{+}_{001}
A_1	1	1	1	1	1
A_2	1	1	-1	1	-1
E	2	2	0	-1	0
T_1	3	-1	-1	0	1
T_2	3	-1	1	0	-1

* polar $\leftrightarrow$ axial conversion

A_1 (A_1)　A_2 (A_2)　E (E)　T_1 (T_1)　T_2 (T_2)

* symmetric product

	A_1	A_2	E	T_1	T_2
A_1	A_1	A_2	E	T_1	T_2
A_2		A_1	E	T_2	T_1
E			$A_1 + E$	$T_1 + T_2$	$T_1 + T_2$
T_1				$A_1 + E + T_2$	$A_2 + E + T_1 + T_2$
T_2					$A_1 + E + T_2$

* anti-symmetric product

A_1	A_2	E	T_1	T_2
$-$	$-$	A_2	T_1	T_1

No. 31 T_d $-43m$ [cubic] tag = "Td"

* character table

T_d	1	2_{001}	3^+_{111}	m_{110}	-4^+_{001}
A_1	1	1	1	1	1
A_2	1	1	1	-1	-1
E	2	2	-1	0	0
T_1	3	-1	0	-1	1
T_2	3	-1	0	1	-1

* polar $\leftrightarrow$ axial conversion

A_1 (A_2) A_2 (A_1) E (E) T_1 (T_2) T_2 (T_1)

* symmetric product

	A_1	A_2	E	T_1	T_2
A_1	A_1	A_2	E	T_1	T_2
A_2		A_1	E	T_2	T_1
E			$A_1 + E$	$T_1 + T_2$	$T_1 + T_2$
T_1				$A_1 + E + T_2$	$A_2 + E + T_1 + T_2$
T_2					$A_1 + E + T_2$

* anti-symmetric product

A_1	A_2	E	T_1	T_2
$-$	$-$	A_2	T_1	T_1

No. 32 O_h $m-3m$ [cubic] tag = "Oh"

* character table

O_h	1	2_{001}	2_{110}	3^+_{111}	4^+_{001}	-1	m_{001}	m_{110}	-3^+_{111}	-4^+_{001}
A_{1g}	1	1	1	1	1	1	1	1	1	1
A_{2g}	1	1	-1	1	-1	1	1	-1	1	-1
E_g	2	2	0	-1	0	2	2	0	-1	0
T_{1g}	3	-1	-1	0	1	3	-1	-1	0	1
T_{2g}	3	-1	1	0	-1	3	-1	1	0	-1
A_{1u}	1	1	1	1	1	-1	-1	-1	-1	-1
A_{2u}	1	1	-1	1	-1	-1	-1	1	-1	1
E_u	2	2	0	-1	0	-2	-2	0	1	0
T_{1u}	3	-1	-1	0	1	-3	1	1	0	-1
T_{2u}	3	-1	1	0	-1	-3	1	-1	0	1

* polar $\leftrightarrow$ axial conversion

A_{1g} (A_{1u}) A_{2g} (A_{2u}) E_g (E_u) T_{1g} (T_{1u}) T_{2g} (T_{2u}) A_{1u} (A_{1g}) A_{2u} (A_{2g}) E_u (E_g) T_{1u} (T_{1g}) T_{2u} (T_{2g})

* symmetric product

	A_{1g}	A_{2g}	E_g	T_{1g}	T_{2g}	A_{1u}	A_{2u}	E_u	T_{1u}	T_{2u}
A_{1g}	A_{1g}	A_{2g}	E_g	T_{1g}	T_{2g}	A_{1u}	A_{2u}	E_u	T_{1u}	T_{2u}
A_{2g}		A_{1g}	E_g	T_{2g}	T_{1g}	A_{2u}	A_{1u}	E_u	T_{2u}	T_{1u}
E_g			$A_{1g} + E_g$	$T_{1g} + T_{2g}$	$T_{1g} + T_{2g}$	E_u	E_u	$A_{1u} + A_{2u} + E_u$	$T_{1u} + T_{2u}$	$T_{1u} + T_{2u}$
T_{1g}				$A_{1g} + E_g + T_{2g}$	$A_{2g} + E_g + T_{1g} + T_{2g}$	T_{1u}	T_{2u}	$T_{1u} + T_{2u}$	$A_{1u} + E_u + T_{1u} + T_{2u}$	$A_{2u} + E_u + T_{1u} + T_{2u}$
T_{2g}					$A_{1g} + E_g + T_{2g}$	T_{2u}	T_{1u}	$T_{1u} + T_{2u}$	$A_{2u} + E_u + T_{1u} + T_{2u}$	$A_{1u} + E_u + T_{1u} + T_{2u}$
A_{1u}						A_{1g}	A_{2g}	E_g	T_{1g}	T_{2g}
A_{2u}							A_{1g}	E_g	T_{2g}	T_{1g}
E_u								$A_{1g} + E_g$	$T_{1g} + T_{2g}$	$T_{1g} + T_{2g}$
T_{1u}									$A_{1g} + E_g + T_{2g}$	$A_{2g} + E_g + T_{1g} + T_{2g}$
T_{2u}										$A_{1g} + E_g + T_{2g}$

* anti-symmetric product

A_{1g}	A_{2g}	E_g	T_{1g}	T_{2g}	A_{1u}	A_{2u}	E_u	T_{1u}	T_{2u}
–	–	A_{2g}	T_{1g}	T_{1g}	–	–	A_{2g}	T_{1g}	T_{1g}