

APPENDIX C

Character Tables

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THE NONAXIAL GROUPS

C_1	E			
A	1			
C_s	E	σ_h		
A'	1	1	x, y, R_z	x^2, y^2, z^2, xy
A''	1	-1	z, R_x, R_y	yz, xz
C_i	E	i		
A_g	1	1	R_x, R_y, R_z	$x^2, y^2, z^2, xy, xz, yz$
A_u	1	-1	x, y, z	

THE AXIAL GROUPS

► The C_n Groups

C_2	E	C_2			
A	1	1	z, R_z	x^2, y^2, z^2, xy	
B	1	-1	x, y, R_x, R_y	yz, xz	
C_3	E	C_3	C_3^2	$\varepsilon = \exp(2\pi i/3)$	
A	1	1	1	z, R_z	$x^2 + y^2, z^2$
E	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon \end{Bmatrix}$			$(x, y), (R_x, R_y)$	$(x^2 - y^2, xy), (yz, xz)$

► The S_n Groups

S_4	E	S_4	C_2	S_4^3		
A	1	1	1	1	R_z	$x^2 + y^2, z^2$
B	1	-1	1	-1	z	$x^2 - y^2, xy$
E	$\begin{Bmatrix} 1 & i & -1 & -i \\ 1 & -i & -1 & i \end{Bmatrix}$				$(x, y), (R_x, R_y)$	(xz, yz)

S_6	E	C_3	C_3^2	i	S_6^5	S_6	$\varepsilon = \exp(2\pi i/3)$	
A_g	1	1	1	1	1	1	R_z	
E_g	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* & 1 & \varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon & 1 & \varepsilon^* & \varepsilon \end{Bmatrix}$						(R_x, R_y)	$x^2 + y^2, z^2$ $(x^2 - y^2, xy)$ (xy, yz)
A_u	1	1	1	-1	-1	-1	z	
E_u	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* & -1 & -\varepsilon & -\varepsilon^* \\ 1 & \varepsilon^* & \varepsilon & -1 & -\varepsilon^* & -\varepsilon \end{Bmatrix}$						(x, y)	

S_8	E	S_8	C_4	S_8^3	C_2	S_8^5	C_4^3	S_8^7	$\varepsilon = \exp(2\pi i/8)$
A	1	1	1	1	1	1	1	1	R_z
B	1	-1	1	-1	1	-1	1	-1	z
E_1	$\begin{Bmatrix} 1 & \varepsilon & i & -\varepsilon^* & -1 & -\varepsilon & -i & \varepsilon^* \\ 1 & \varepsilon^* & -i & -\varepsilon & -1 & -\varepsilon^* & i & \varepsilon \end{Bmatrix}$								$(x, y), (R_x, R_y)$
E_2	$\begin{Bmatrix} 1 & i & -1 & -i & 1 & i & -1 & -i \\ 1 & -i & -1 & i & 1 & -i & -1 & i \end{Bmatrix}$								$(x^2 - y^2, xy)$
E_3	$\begin{Bmatrix} 1 & -\varepsilon^* & -i & \varepsilon & -1 & \varepsilon^* & i & -\varepsilon \\ 1 & -\varepsilon & i & \varepsilon^* & -1 & \varepsilon & -i & -\varepsilon^* \end{Bmatrix}$								(xz, yz)

► The C_{nv} Groups

C_{2v}	E	C_2	$\sigma_v(xz)$	$\sigma'_v(yz)$		
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz

C_{3v}	E	$2C_3$	$3\sigma_v$		
A_1	1	1	1	z	$x^2 + y^2, z^2$
A_2	1	1	-1	R_z	
E	2	-1	0	$(x, y), (R_x, R_y)$	$(x^2 - y^2, xy), (xz, yz)$

C_{4v}	E	$2C_4$	C_2	$2\sigma_v$	$2\sigma_d$		
A_1	1	1	1	1	1	z	$x^2 + y^2, z^2$
A_2	1	1	1	-1	-1	R_z	
B_1	1	-1	1	1	-1		$x^2 - y^2$
B_2	1	-1	1	-1	1		xy
E	2	0	-2	0	0	$(x, y), (R_x, R_y)$	(xz, yz)

C_{3v}	E	$2C_3$	$2C_2$	$3\sigma_v$		
A_1	1	1	1	1	z	$x^2 + y^2, z^2$
A_2	1	1	1	-1	R_z	
E_1	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	$(x, y), (R_x, R_y)$	(xz, yz)
E_2	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0		$(x^2 - y^2, xy)$

C_{6v}	E	$2C_6$	$2C_3$	C_2	$3\sigma_v$	$3\sigma_d$		
A_1	1	1	1	1	1	1	z	$x^2 + y^2, z^2$
A_2	1	1	1	1	-1	-1	R_z	
B_1	1	-1	1	-1	1	-1		
B_2	1	-1	1	-1	-1	1		
E_1	2	1	-1	-2	0	0	$(x, y), (R_x, R_y)$	(xz, yz)
E_2	2	-1	-1	2	0	0		$(x^2 - y^2, xy)$

► The C_{nh} Groups

C_{2h}	E	C_2	i	σ_h		
A_g	1	1	1	1	R_z	x^2, y^2, z^2, xy
B_g	1	-1	1	-1	R_x, R_y	xz, yz
A_u	1	1	-1	-1	z	
B_u	1	-1	-1	1	x, y	

C_{3h}	E	C_3	C_3^2	σ_h	S_3	S_3^2	$\varepsilon = \exp(2\pi i/3)$	
A'	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$
E'	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon & 1 & \varepsilon \\ \varepsilon^* & \varepsilon & 1 \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon^* & \varepsilon & 1 \\ \varepsilon & \varepsilon^* & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon & \varepsilon^* & 1 \\ \varepsilon^* & \varepsilon & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon^* & \varepsilon & 1 \\ \varepsilon & \varepsilon^* & \varepsilon \end{Bmatrix}$	(x, y)	$(x^2 - y^2, xy)$
A''	1	1	1	-1	-1	-1	z	
E''	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon & 1 & \varepsilon \\ \varepsilon^* & \varepsilon & 1 \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon^* & \varepsilon & 1 \\ \varepsilon & \varepsilon^* & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* \\ 1 & \varepsilon^* & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon & \varepsilon^* & 1 \\ \varepsilon^* & \varepsilon & \varepsilon \end{Bmatrix}$	$\begin{Bmatrix} \varepsilon^* & \varepsilon & 1 \\ \varepsilon & \varepsilon^* & \varepsilon \end{Bmatrix}$	(R_x, R_y)	(xz, yz)

THE DIHEDRAL GROUPS

The D_n Groups

D_2	E	$C_2(z)$	$C_2(y)$	$C_2(x)$		
A	1	1	1	1		x^2, y^2, z^2
B_1	1	1	-1	-1	z, R_z	xy
B_2	1	-1	1	-1	y, R_y	xz
B_3	1	-1	-1	1	x, R_x	yz

D_3	E	$2C_3$	$3C_2$	$(x \text{ axis is coincident with } C_2)$		
A_1	1	1	1			$x^2 + y^2, z^2$
A_2	1	1	-1	z, R_z		
E	2	-1	0	$(x, y), (R_x, R_y)$		$(x^2 - y^2, xy), (xz, yz)$

D_4	E	$2C_4$	$C_2(=C_4^2)$	$2C_2'$	$2C_2''$	$(x \text{ axis coincident with } C_2')$	
A_1	1	1	1	1	1		$x^2 + y^2, z^2$
A_2	1	1	1	-1	-1	z, R_z	
B_1	1	-1	1	1	-1		$x^2 - y^2$
B_2	1	-1	1	-1	1		xy
E	2	0	-2	0	0	$(x, y), (R_x, R_y)$	(xz, yz)

D_5	E	$2C_5$	$2C_5^2$	$5C_2$	$(x \text{ axis coincident with } C_2)$	
A_1	1	1	1	1		$x^2 + y^2, z^2$
A_2	1	1	1	-1	z, R_z	
E_1	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	$(x, y), (R_x, R_y)$	(xz, yz)
E_2	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0		$(x^2 - y^2, xy)$

D_6	E	$2C_6$	$2C_3$	C_2	$3C_2'$	$3C_2''$	$(x \text{ axis coincident with } C_2')$	
A_1	1	1	1	1	1	1		$x^2 + y^2, z^2$
A_2	1	1	1	1	-1	-1	z, R_z	
B_1	1	-1	1	-1	1	-1		
B_2	1	-1	1	-1	-1	1		
E_1	2	1	-1	-2	0	0	$(x, y), (R_x, R_y)$	(xz, yz)
E_2	2	-1	-1	2	0	0		$(x^2 - y^2, xy)$

► The D_{nh} Groups

D_{2h}	E	$C_2(z)$	$C_2(y)$	$C_2(x)$	i	$\sigma(xy)$	$\sigma(xz)$	$\sigma(yz)$			
A_g	1	1	1	1	1	1	1	1	R_z	x^2, y^2, z^2	
B_{1g}	1	1	-1	-1	1	1	-1	-1		R_y	xy
B_{2g}	1	-1	1	-1	1	-1	1	-1		R_x	xz
B_{3g}	1	-1	-1	1	1	-1	-1	1	R_x	yz	
A_u	1	1	1	1	-1	-1	-1	-1			
B_{1u}	1	1	-1	-1	-1	-1	1	1		z	
B_{2u}	1	-1	1	-1	-1	1	-1	1		y	
B_{3u}	1	-1	-1	1	-1	1	1	-1		x	

D_{3h}	E	$2C_3$	$3C_2$	σ_h	$2S_3$	$3\sigma_v$	(x axis coincident with C_2)	
A_1'	1	1	1	1	1	1		$x^2 + y^2, z^2$
A_2'	1	1	-1	1	1	-1	R_z	
E'	2	-1	0	2	-1	0	(x, y)	$(x^2 - y^2, xy)$
A_1''	1	1	1	-1	-1	-1		
A_2''	1	1	-1	-1	-1	1	z	
E''	2	-1	0	-2	1	0	(R_x, R_y)	(xz, yz)

D_{4h}	E	$2C_4$	C_2	$2C_2'$	$2C_2''$	i	$2S_4$	σ_h	$2\sigma_v$	$2\sigma_d$	(x axis coincident with C_2')		
A_{1g}	1	1	1	1	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$	
A_{2g}	1	1	1	-1	-1	1	1	1	-1	-1			
B_{1g}	1	-1	1	1	-1	1	-1	1	1	-1			$x^2 - y^2$
B_{2g}	1	-1	1	-1	1	1	-1	1	-1	1		xy	
E_g	2	0	-2	0	0	2	0	-2	0	0	(R_x, R_y)	(xz, yz)	
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	0	-2	0	0	-2	0	2	0	0	(x, y)		

D_{5h}	E	$2C_5$	$2C_5^2$	$5C_2$	σ_h	$2S_5$	$2S_5^3$	$5\sigma_v$	(x axis coincident with C_2)			
A_1'	1	1	1	1	1	1	1	1		R_z	$x^2 + y^2, z^2$	
A_2'	1	1	1	-1	1	1	1	-1				
E_1'	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	(x, y)			
E_2'	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0			$(x^2 - y^2, xy)$	
A_1''	1	1	1	1	-1	-1	-1	-1				
A_2''	1	1	1	-1	-1	-1	-1	1				
E_1''	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	-2	$-2 \cos 72^\circ$	$-2 \cos 144^\circ$	0		z		
E_2''	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0	-2	$-2 \cos 144^\circ$	$-2 \cos 72^\circ$	0	(R_x, R_y)		(xz, yz)	

D_{6h}	E	$2C_6$	$2C_3$	C_2	$3C_2'$	$3C_2''$	i	$2S_6$	$2S_6$	σ_h	$3\sigma_d$	$3\sigma_v$	(x axis coincident with C_2')	
A_{1g}	1	1	1	1	1	1	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$
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	1	-1	-2	0	0	2	1	-1	-2	0	0	(R_x, R_y)	(xz, yz) $(x^2 - y^2, xy)$
E_{2g}	2	-1	-1	2	0	0	2	-1	-1	2	0	0		
A_{1u}	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	z	
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	1	-1	-2	0	0	-2	-1	1	2	0	0	(x, y)	
E_{2u}	2	-1	-1	2	0	0	-2	1	1	-2	0	0		

D_{3h}	E	$2C_3$	$2C_2$	C_2	$4C_2'$	$4C_2''$	i	$2S_6$	$2S_6$	$2S_6$	σ_h	$4\sigma_v$	$4\sigma_d$	(x axis coincident with C_2')	
A_{1g}	1	1	1	1	1	1	1	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$
A_{2g}	1	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	-1		
B_{2g}	1	-1	-1	1	1	-1	1	1	-1	-1	1	-1	1		
E_{1g}	2	$\sqrt{2}$	$-\sqrt{2}$	0	-2	0	0	2	$\sqrt{2}$	$-\sqrt{2}$	0	-2	0	(R_x, R_y)	(xz, yz) $(x^2 - y^2, xy)$
E_{2g}	2	0	0	-2	2	0	0	2	0	0	-2	2	0		
E_{3g}	2	$-\sqrt{2}$	$\sqrt{2}$	0	-2	0	0	2	$-\sqrt{2}$	$\sqrt{2}$	0	-2	0		
A_{1u}	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1	-1	z	
A_{2u}	1	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	-1		
B_{2u}	1	-1	-1	1	1	-1	-1	-1	1	1	-1	-1	1		
E_{1u}	2	$\sqrt{2}$	$-\sqrt{2}$	0	-2	0	0	-2	$-\sqrt{2}$	$\sqrt{2}$	0	2	0	(x, y)	
E_{2u}	2	0	0	-2	2	0	0	-2	0	0	2	-2	0		
E_{3u}	2	$-\sqrt{2}$	$\sqrt{2}$	0	-2	0	0	-2	$\sqrt{2}$	$-\sqrt{2}$	0	2	0		

► The D_{nd} Groups

D_{2d}	E	$2S_4$	C_2	$2C_2'$	$2\sigma_d$	(x axis coincident with C_2')		
A_1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$	
A_2	1	1	1	-1	-1			
B_1	1	-1	1	1	-1			$x^2 - y^2$
B_2	1	-1	1	-1	1			xy
E	2	0	-2	0	0	$(x, y), (R_x, R_y)$	(xz, yz)	

D_{3d}	E	$2C_3$	$3C_2$	i	$2S_6$	$3\sigma_d$	(x axis coincident with C_2)			
A_{1g}	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$		
A_{2g}	1	1	-1	1	1	-1				
E_g	2	-1	0	2	-1	0			(R_x, R_y)	$(x^2 - y^2, xy); (xz, yz)$
A_{1u}	1	1	1	-1	-1	-1			z	
A_{2u}	1	1	-1	-1	-1	1	(x, y)			
E_u	2	-1	0	-2	1	0				

D_{4d}	E	$2S_8$	$2C_4$	$2S_8^3$	C_2	$4C_2'$	$4\sigma_d$	(x axis coincident with C_2')	
A_1	1	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$
A_2	1	1	1	1	1	-1	-1		
B_1	1	-1	1	-1	1	1	-1		
B_2	1	-1	1	-1	1	-1	1	z	
E_1	2	$\sqrt{2}$	0	$-\sqrt{2}$	-2	0	0	(x, y)	
E_2	2	0	-2	0	2	0	0		$(x^2 - y^2, xy)$
E_3	2	$-\sqrt{2}$	0	$\sqrt{2}$	-2	0	0	(R_x, R_y)	(xz, yz)

D_{3d}	1	$2C_3$	$2C_2$	i	$2S_6$	$2S_6^5$	$5\sigma_d$	(x axis coincident with C_2)	
A_{1g}	1	1	1	1	1	1	1	R_z	$x^2 + y^2, z^2$
A_{2g}	1	1	1	-1	1	1	-1		
E_{1g}	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$		
E_{2g}	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0	$(x^2 - y^2, xy)$
A_{1u}	1	1	1	-1	-1	-1	-1	z	
A_{2u}	1	1	1	-1	-1	-1	1		
E_{1u}	2	$2 \cos 72^\circ$	$2 \cos 144^\circ$	0	-2	$-2 \cos 72^\circ$	$-2 \cos 144^\circ$		
E_{2u}	2	$2 \cos 144^\circ$	$2 \cos 72^\circ$	0	-2	$-2 \cos 144^\circ$	$-2 \cos 72^\circ$	0	

D_{6d}	E	$2S_{12}$	$2C_6$	$2S_4$	$2C_3$	$2S_6^5$	C_2	$6C_2'$	$6\sigma_d$	(x axis coincident with C_2)	
A_1	1	1	1	1	1	1	1	1	1	R_z	$x^2 + z^2, z^2$
A_2	1	1	1	1	1	1	1	-1	-1		
B_1	1	-1	1	-1	1	-1	1	1	-1		
B_2	1	-1	1	-1	1	-1	1	-1	1	z	
E_1	2	$\sqrt{3}$	1	0	-1	$-\sqrt{3}$	-2	0	0	(x, y)	
E_2	2	1	-1	-2	-1	1	2	0	0		$(x^2 - y^2, xy)$
E_3	2	0	-2	0	2	0	-2	0	0		
E_4	2	-1	-1	2	-1	-1	2	0	0		
E_5	2	$-\sqrt{3}$	1	0	-1	$\sqrt{3}$	-2	0	0	(R_x, R_y)	(xz, yz)

THE CUBIC GROUPS

$\psi = \exp(2\pi i/3)$

T	E	$4C_3$	$4C_3^2$	$3C_2$	$\varepsilon = \exp(2\pi i/3)$	
A	1	1	1	1		$x^2 + y^2 + z^2$
E	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* & 1 \\ 1 & \varepsilon^* & \varepsilon & 1 \end{Bmatrix}$					$(2z^2 - x^2 - y^2,$ $x^2 - y^2)$
T		3	0	0	-1	$(R, R_y, R_z), (x, y, z)$

T_h	E	$4C_3$	$4C_3^2$	$3C_2$	i	$4S_6$	$4S_6^5$	$3\sigma_h$	$(\varepsilon = \exp(2\pi i/3))$
A_g	1	1	1	1	1	1	1	1	$x^2 + y^2 + z^2$
A_u	1	1	1	1	-1	-1	-1	-1	
E_g	$\left\{ \begin{array}{l} 1 \quad \varepsilon \quad \varepsilon^* \quad 1 \quad 1 \quad \varepsilon \quad \varepsilon^* \quad 1 \\ 1 \quad \varepsilon^* \quad \varepsilon \quad 1 \quad 1 \quad \varepsilon^* \quad \varepsilon \quad 1 \end{array} \right\}$								$(2z^2 - x^2 - y^2, x^2 - y^2)$
E_u	$\left\{ \begin{array}{l} 1 \quad \varepsilon \quad \varepsilon^* \quad 1 \quad -1 \quad -\varepsilon \quad -\varepsilon^* \quad -1 \\ 1 \quad \varepsilon^* \quad \varepsilon \quad 1 \quad -1 \quad -\varepsilon^* \quad -\varepsilon \quad -1 \end{array} \right\}$								
T_g	3	0	0	-1	3	0	0	-1	(R_x, R_y, R_z)
T_u	3	0	0	-1	-3	0	0	1	(x, y, z)

T_d	E	$8C_3$	$3C_2$	$6S_4$	$6\sigma_d$	
A_1	1	1	1	1	1	$x^2 + y^2 + z^2$
A_2	1	1	1	-1	-1	
E	2	-1	2	0	0	$(2z^2 - x^2 - y^2, x^2 - y^2)$
T_1	3	0	-1	1	-1	
T_2	3	0	-1	-1	1	(R_x, R_y, R_z)
						(x, y, z)

► Octahedral Groups

O	E	$6C_4$	$3C_2(=C_4^2)$	$8C_3$	$6C_2$	
A_1	1	1	1	1	1	$x^2 + y^2 + z^2$
A_2	1	-1	1	1	-1	
E	2	0	2	-1	0	$(2z^2 - x^2 - y^2, x^2 - y^2)$
T_1	3	1	-1	0	-1	
T_2	3	-1	-1	0	1	$(R_x, R_y, R_z), (x, y, z)$
						(xy, xz, yz)

O_h	E	$8C_3$	$6C_2$	$6C_4$	$3C_2(=C_4^2)$	i	$6S_4$	$8S_6$	$3\sigma_h$	$6\sigma_d$	
A_{1g}	1	1	1	1	1	1	1	1	1	1	$x^2 + y^2 + z^2$
A_{2g}	1	1	-1	-1	1	1	-1	1	1	-1	
E_g	2	-1	0	0	2	2	0	-1	2	0	$(2z^2 - x^2 - y^2, x^2 - y^2)$
T_{1g}	3	0	-1	1	-1	3	1	0	-1	-1	
T_{2g}	3	0	1	-1	-1	3	-1	0	-1	1	(R_x, R_y, R_z)
A_{1u}	1	1	1	1	1	-1	-1	-1	-1	-1	(xz, yz, xy)
A_{2u}	1	1	-1	-1	1	-1	1	-1	-1	1	
E_u	2	-1	0	0	2	-2	0	1	-2	0	
T_{1u}	3	0	-1	1	-1	-3	-1	0	1	1	(x, y, z)
T_{2u}	3	0	1	-1	-1	-3	1	0	1	-1	

