

**Character Table 9**

**The Cubic Groups**

$T$ (23)	$E$	$4C_3$	$4C_3^2$	$3C_2$		$\varepsilon = \exp(2\pi i/3)$
A	1	1	1	1		$x^2 + y^2 + z^2$
E	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* & 1 \\ 1 & \varepsilon^* & \varepsilon & 1 \end{Bmatrix}$					$(\sqrt{3} (x^2 - y^2)2z^2 - x^2 - y^2)$
T	3	0	0	-1	$(x, y, z)$ $(R_x, R_y, R_z)$	$(xy, xz, yz)$

$T_d$ ( $\bar{4}3m$ )	$E$	$8C_3$	$3C_2$	$6S_4$	$6\sigma_d$	
A <sub>1</sub>	1	1	1	1	1	$x^2 + y^2 + z^2$
A <sub>2</sub>	1	1	1	-1	-1	
E	2	-1	2	0	0	$(2z^2 - x^2 - y^2, \sqrt{3} (x^2 - y^2))$
T <sub>1</sub>	3	0	-1	1	-1	$(R_x, R_y, R_z)$
T <sub>2</sub>	3	0	-1	-1	1	$(x, y, z)$ $(xy, xz, yz)$

$T_h$ ( $m\bar{3}$ )	$E$	$4C_3$	$4C_3^2$	$3C_2$	$i$	$4S_6$	$4S_6^2$	$3\sigma_d$	$\varepsilon = \exp(2\pi i/3)$
A <sub>g</sub>	1	1	1	1	1	1	1	1	$x^2 + y^2 + z^2$
E <sub>g</sub>	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* & 1 & 1 & \varepsilon & \varepsilon^* & 1 \\ 1 & \varepsilon^* & \varepsilon & 1 & 1 & \varepsilon^* & \varepsilon & 1 \end{Bmatrix}$								$(2z^2 - x^2 - y^2, \sqrt{3} (x^2 - y^2))$
T <sub>g</sub>	3	0	0	-1	3	0	0	-1	$(R_x, R_y, R_z)$ $(xy, yz, xz)$
A <sub>u</sub>	1	1	1	1	-1	-1	-1	-1	
E <sub>u</sub>	$\begin{Bmatrix} 1 & \varepsilon & \varepsilon^* & 1 & -1 & -\varepsilon & -\varepsilon^* & -1 \\ 1 & \varepsilon^* & \varepsilon & 1 & -1 & -\varepsilon^* & -\varepsilon & -1 \end{Bmatrix}$								
T <sub>u</sub>	3	0	0	-1	-3	0	0	1	$(x, y, z)$

$O$ (432)	$E$	$8C_3$	$3C_2$	$6C_4$	$6C_2'$	
A <sub>1</sub>	1	1	1	1	1	$x^2 + y^2 + z^2$
A <sub>2</sub>	1	1	1	-1	-1	
E	2	-1	2	0	0	$(2z^2 - x^2 - y^2, \sqrt{3} (x^2 - y^2))$
T <sub>1</sub>	3	0	-1	1	-1	$(x, y, z)$ $(R_x, R_y, R_z)$
T <sub>2</sub>	3	0	-1	-1	1	$(xy, xz, yz)$

**Character Table 9 (cont...)**
**The Cubic Groups**

$O_h$ ( $m3m$ )	$E$	$8C_3$	$6C_2$	$6C_4$	$3C_2$ ( $= C_4^2$ )	$i$	$6S_4$	$8S_6$	$3\sigma_h$	$6\sigma_d$	
$A_{1g}$	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	$(2z^2 - x^2 - y^2,$ $\sqrt{3}(x^2 - y^2))$
$T_{1g}$	3	0	-1	1	-1	3	1	0	-1	-1	$(R_x, R_y, R_z)$
$T_{2g}$	3	0	1	-1	-1	3	-1	0	-1	1	$(xy, xz, yz)$
$A_{1u}$	1	1	1	1	1	-1	-1	-1	-1	-1	
$A_{2u}$	1	1	-1	-1	1	-1	1	-1	-1	1	
$E_u$	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	