International Tables for Crystallography (2006). Vol. D, Table 1.2.6.5, pp. 58–60.

Table 1.2.6.5. *Irreducible representations and character tables for the 32 crystallographic point groups in three dimensions*

(*a*) C_1

C_1	ε
n	1
Order	1
Γ_1	1

1 C_1	$\Gamma_1 : A = \chi_1$	x, y, z	$x^2, y^2, z^2, yz, xz, xy$

(*b*) C_2

C_2	ε	α
n	1	1
Order	1	2
Γ_1	1	1
Γ_2	1	-1

2 C_2	$\alpha = C_{2z}$	$\Gamma_1 : A = \chi_1$ $\Gamma_2 : B = \chi_3$	z x, y	x^2, y^2, z^2, xy yz, xz
m C_s	$\alpha = \sigma_z$	$\Gamma_1 : A' = \chi_1$ $\Gamma_2 : A'' = \chi_3$	x, y z	x^2, y^2, z^2, xy yz, xz
$\bar{1}$ C_i	$\alpha = I$	$\Gamma_1 : A_g = \chi_1^+$ $\Gamma_2 : A_u = \chi_1^-$	 x, y, z	$x^2, y^2, z^2, yz, xz, xy$

(*c*) C_3 [$\omega = \exp(2\pi i/3)$].

C_3	ε	α	α^2
n	1	1	1
Order	1	3	3
Γ_1	1	1	1
Γ_2	1	ω	ω^2
Γ_3	1	ω^2	ω

Matrices of the real two-dimensional representation:

	ε	α	α^2
$\Gamma_2 \oplus \Gamma_3$	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$	$\begin{pmatrix} -1 & 1 \\ -1 & 0 \end{pmatrix}$

3 C_3	$\alpha = C_{3z}$	$\Gamma_1 : A = \chi_1$ $\Gamma_2 \oplus \Gamma_3 : E = \chi_{1c} + \chi_{1c}^*$	z x, y	$x^2 + y^2, z^2$ $x^2 - y^2, xz, yz, xy$

(*d*) C_4

C_4	ε	α	α^2	α^3
n	1	1	1	1
Order	1	4	2	4
Γ_1	1	1	1	1
Γ_2	1	i	-1	$-i$
Γ_3	1	-1	1	-1
Γ_4	1	$-i$	-1	i

Matrices of the real two-dimensional representation:

	ε	α	α^2	α^3
$\Gamma_2 \oplus \Gamma_4$	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$

4 C_4	$\alpha = C_{4z}$	$\Gamma_1 : A = \chi_1$ $\Gamma_3 : B = \chi_3$ $\Gamma_2 \oplus \Gamma_4 : E = \chi_{1c} + \chi_{1c}^*$	z x, y	$x^2 + y^2, z^2$ $x^2 - y^2, xy$ yz, xz
$\bar{4}$ S_4	$\alpha = S_4$	$\Gamma_1 : A = \chi_1$ $\Gamma_3 : B = \chi_3$ $\Gamma_2 \oplus \Gamma_4 : E = \chi_{1c} + \chi_{1c}^*$	 z x, y	$x^2 + y^2, z^2$ $x^2 - y^2, xy$ yz, xz

(*e*) C_6 [$\omega = \exp(\pi i/3)$].

C_6	ε	α	α^2	α^3	α^4	α^5
n	1	1	1	1	1	1
Order	1	6	3	2	3	6
Γ_1	1	1	1	1	1	1
Γ_2	1	ω	ω^2	-1	$-\omega$	$-\omega^2$
Γ_3	1	ω^2	$-\omega$	1	ω^2	$-\omega$
Γ_4	1	-1	1	-1	1	-1
Γ_5	1	$-\omega$	ω^2	1	$-\omega$	ω^2
Γ_6	1	$-\omega^2$	$-\omega$	-1	ω^2	ω

Matrices of the real representations:

	$\Gamma_2 \oplus \Gamma_6$	$\Gamma_3 \oplus \Gamma_5$
ε	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
α	$\begin{pmatrix} 1 & -1 \\ 1 & 0 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$
α^2	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$	$\begin{pmatrix} -1 & 1 \\ -1 & 0 \end{pmatrix}$
α^3	$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
α^4	$\begin{pmatrix} -1 & 1 \\ -1 & 0 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$
α^5	$\begin{pmatrix} 0 & 1 \\ -1 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 1 \\ -1 & 0 \end{pmatrix}$

6 C_6	$\alpha = C_{6z}$	$\Gamma_1 : A = \chi_1$ $\Gamma_4 : B = \chi_3$ $\Gamma_2 \oplus \Gamma_6$: $E_1 = \chi_{1c} + \chi_{1c}^*$ $\Gamma_3 \oplus \Gamma_5$: $E_2 = \chi_{2c} + \chi_{2c}^*$	z x, y 	$x^2 + y^2, z^2$ xz, yz $x^2 - y^2, xy$
$\bar{3}$ S_6	$\alpha = S_{3z}$	$\Gamma_1 : A_g = \chi_1^+$ $\Gamma_4 : A_u = \chi_1^-$ $\Gamma_2 \oplus \Gamma_6$: $E_u = \chi_{1c}^- + \chi_{1c}^{-*}$ $\Gamma_3 \oplus \Gamma_5$: $E_g = \chi_{1c}^+ + \chi_{1c}^{+*}$	 z x, y $x^2 - y^2, xy, xz, yz$	$x^2 + y^2, z^2$
$\bar{6}$ C_{3h}	$\alpha = S_{6z}$	$\Gamma_1 : A' = \chi_1$ $\Gamma_4 : A'' = \chi_3$ $\Gamma_2 \oplus \Gamma_6$: $E' = \chi_{2c} + \chi_{2c}^*$ $\Gamma_3 \oplus \Gamma_5$: $E'' = \chi_{1c} + \chi_{1c}^*$	 z x, y	$x^2 + y^2, z^2$ xz, yz $x^2 - y^2, xy$

(*f*) D_2

D_2	ε	α	β	$\alpha\beta$
n	1	1	1	1
Order	1	2	2	2
Γ_1	1	1	1	1
Γ_2	1	1	-1	-1
Γ_3	1	-1	1	-1
Γ_4	1	-1	-1	1

222 D_2	$\alpha = C_{2x}$ $\beta = C_{2y}$ $\alpha\beta = C_{2z}$	$\Gamma_1 : A_1 = \chi_1$ $\Gamma_2 : B_3 = \chi_3$ $\Gamma_3 : B_2 = \chi_4$ $\Gamma_4 : B_1 = \chi_2$	 x y z	x^2, y^2, z^2 yz xz xz
$mm2$ C_{2v}	$\alpha = C_{2z}$ $\beta = \sigma_x$ $\alpha\beta = \sigma_y$	$\Gamma_1 : A_1 = \chi_1$ $\Gamma_2 : A_2 = \chi_2$ $\Gamma_3 : B_2 = \chi_3$ $\Gamma_4 : B_1 = \chi_4$	z y x	x^2, y^2, z^2 xy yz xz
$2/m$ C_{2h}	$\alpha = C_{2z}$ $\beta = \sigma_z$ $\alpha\beta = I$	$\Gamma_1 : A_g = \chi_1^+$ $\Gamma_2 : A_u = \chi_1^-$ $\Gamma_3 : B_u = \chi_3^-$ $\Gamma_4 : B_g = \chi_3^+$	 z x, y 	x^2, y^2, z^2, xy z

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Table 1.2.6.5 (*cont.*)

(*g*) D_3

D_3	ε	α	β
n	1	2	3
Order	1	3	2
Γ_1	1	1	1
Γ_2	1	1	−1
Γ_3	2	−1	0

Matrices of the two-dimensional representation:

	ε	α	β
Γ_3	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$	$\begin{pmatrix} -1 & 1 \\ 0 & 1 \end{pmatrix}$

32 D_3	$\alpha = C_{3z}$ $\beta = C_{2x}$	$\Gamma_1 : A_1 = \chi_1$		x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$	z	
		$\Gamma_3 : E = \chi_1$	x, y	xz, yz, xy, x^2-y^2
$3m$ C_{3v}	$\alpha = C_{3z}$ $\beta = \sigma_v$	$\Gamma_1 : A_1 = \chi_1$	z	x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$		
		$\Gamma_3 : E = \chi_1$	x, y	xz, yz, xy, x^2-y^2

(*h*) D_4

D_4	ε	α	α^2	β	$\alpha\beta$
n	1	2	1	2	2
Order	1	4	2	2	2
Γ_1	1	1	1	1	1
Γ_2	1	1	1	−1	−1
Γ_3	1	−1	1	1	−1
Γ_4	1	−1	1	−1	1
Γ_5	2	0	−2	0	0

Matrices of the two-dimensional representation:

	Γ_5
ε	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
α	$\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$
α^2	$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$
β	$\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$
$\alpha\beta$	$\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

422 D_4	$\alpha = C_{4z}$ $\beta = C_{2x}$	$\Gamma_1 : A_1 = \chi_1$		x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$	z	
		$\Gamma_3 : B_1 = \chi_3$		x^2-y^2
		$\Gamma_4 : B_2 = \chi_4$		xy
		$\Gamma_5 : E = \chi_1$	x, y	xz, yz
$4mm$ C_{4v}	$\alpha = C_{4z}$ $\beta = \sigma_v$	$\Gamma_1 : A_1 = \chi_1$	z	x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$		
		$\Gamma_3 : B_1 = \chi_3$		x^2-y^2
		$\Gamma_4 : B_2 = \chi_4$		xy
		$\Gamma_5 : E = \chi_1$	x, y	xz, yz
$\bar{4}2m$ D_{2d}	$\alpha = S_{4z}$ $\beta = C_{2v}$ $\alpha\beta = \sigma_d$	$\Gamma_1 : A_1 = \chi_1$		x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$		
		$\Gamma_3 : B_1 = \chi_3$		x^2-y^2
		$\Gamma_4 : B_2 = \chi_4$	z	xy
		$\Gamma_5 : E = \chi_1$	x, y	xz, yz

(*i*) D_6

D_6	ε	α	α^2	α^3	β	$\alpha\beta$
n	1	2	2	1	3	3
Order	1	6	3	2	2	2
Γ_1	1	1	1	1	1	1
Γ_2	1	1	1	1	−1	−1
Γ_3	1	−1	1	−1	1	−1
Γ_4	1	−1	1	−1	−1	1
Γ_5	2	1	−1	−2	0	0
Γ_6	2	−1	−1	2	0	0

Matrices of the two-dimensional representations:

	Γ_5	Γ_6
ε	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
α	$\begin{pmatrix} 1 & -1 \\ 1 & 0 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$
α^2	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$	$\begin{pmatrix} -1 & 1 \\ -1 & 0 \end{pmatrix}$
α^3	$\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
β	$\begin{pmatrix} -1 & 1 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 1 \\ 0 & 1 \end{pmatrix}$
$\alpha\beta$	$\begin{pmatrix} -1 & 0 \\ -1 & 1 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

622 D_6	$\alpha = C_{6z}$ $\beta = C_{2x}$	$\Gamma_1 : A_1 = \chi_1$		x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$	z	
		$\Gamma_3 : B_1 = \chi_3$		x^2-y^2
		$\Gamma_4 : B_2 = \chi_4$		xy
		$\Gamma_5 : E_1 = \chi_1$	x, y	xz, yz
		$\Gamma_6 : E_2 = \chi_2$		
$6mm$ C_{6v}	$\alpha = C_{6z}$ $\beta = \sigma_v$	$\Gamma_1 : A_1 = \chi_1$	z	x^2+y^2, z^2
		$\Gamma_2 : A_2 = \chi_2$		
		$\Gamma_3 : B_1 = \chi_3$		x^2-y^2
		$\Gamma_4 : B_2 = \chi_4$		xy
		$\Gamma_5 : E_1 = \chi_1$	x, y	xz, yz
		$\Gamma_6 : E_2 = \chi_2$		
$\bar{6}2m$ D_{3h}	$\alpha = S_{6z}$ $\beta = C_{2v}$ $\alpha\beta = \sigma_d$	$\Gamma_1 : A_1' = \chi_1$		x^2+y^2, z^2
		$\Gamma_2 : A_2' = \chi_2$		
		$\Gamma_3 : A_1'' = \chi_3$		x^2-y^2
		$\Gamma_4 : A_2'' = \chi_4$	z	xy
		$\Gamma_5 : E' = \chi_2$		xz, yz
		$\Gamma_6 : E'' = \chi_1$	x, y	
$\bar{3}m$ D_{3v}	$\alpha = S_{3z}$ $\beta = \sigma_d$	$\Gamma_1 : A_{1g} = \chi_1^+$		x^2+y^2, z^2
		$\Gamma_2 : A_{2g} = \chi_2^+$		
		$\Gamma_3 : A_{1u} = \chi_1^-$	z	
		$\Gamma_4 : A_{2u} = \chi_2^-$		
		$\Gamma_5 : E_u = \chi_1^-$	x, y	
		$\Gamma_6 : E_g = \chi_1^+$		$xz.yz, xy, x^2-y^2$

(*j*) T [$\omega = \exp(2\pi i/3)$].

T	ε	α	α^2	β
n	1	4	4	3
Order	1	3	3	2
Γ_1	1	1	1	1
Γ_2	1	ω	ω^2	1
Γ_3	1	ω^2	ω	1
Γ_4	3	0	0	−1

Table 1.2.6.5 (*cont.*)

Real representations of dimension $d > 1$:

	$\Gamma_2 \oplus \Gamma_3$	Γ_4
ε	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
α	$\begin{pmatrix} 1 & -1 \\ 0 & -1 \end{pmatrix}$	$\begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{pmatrix}$
α^2	$\begin{pmatrix} 1 & -1 \\ 0 & -1 \end{pmatrix}$	$\begin{pmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$
β	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

23	$\alpha = C_{3d}$	$\Gamma_1 : A = \chi_1$		$x^2 + y^2 + z^2$
T	$\beta = C_{2z}$	$\Gamma_2 \oplus \Gamma_3 : E = \chi_{3c} + \chi_{3c}^*$		$x^2 - y^2, x^2 - z^2$
		$\Gamma_4 : T = \chi_1$	x, y, z	xy, xz, yz

(*k*) O

O	ε	β	α^2	α	$\alpha\beta$
n	1	8	3	6	6
Order	1	3	2	4	2
Γ_1	1	1	1	1	1
Γ_2	1	1	1	−1	−1
Γ_3	2	−1	2	0	0
Γ_4	3	0	−1	1	−1
Γ_5	3	0	−1	−1	1

Higher-dimensional representations:

	Γ_3	Γ_4	Γ_5
ε	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
β	$\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$	$\begin{pmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$	$\begin{pmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$
α^2	$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
α	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$	$\begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 0 & 1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & -1 \end{pmatrix}$
$\alpha\beta$	$\begin{pmatrix} -1 & 0 \\ -1 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & -1 & 0 \end{pmatrix}$

432	$\alpha = C_{4z}$	$\Gamma_1 : A_1 = \chi_1$		$x^2 + y^2 + z^2$
O	$\beta = C_{3d}$	$\Gamma_2 : A_2 = \chi_2$		
	$\alpha\beta = C_2$	$\Gamma_3 : E = \chi_3$		$x^2 - y^2, y^2 - z^2$
		$\Gamma_4 : T_1 = \chi_1$	x, y, z	
		$\Gamma_5 : T_2 = \chi_2$		xy, xz, yz
$\bar{4}3m$	$\alpha = S_{4z}$	$\Gamma_1 : A_1 = \chi_1$		$x^2 + y^2 + z^2$
T_d	$\beta = C_{3d}$	$\Gamma_2 : A_2 = \chi_2$		
	$\alpha\beta = \sigma_d$	$\Gamma_3 : E = \chi_3$		$x^2 - y^2, y^2 - z^2$
		$\Gamma_4 : T_1 = \chi_1$		
		$\Gamma_5 : T_2 = \chi_2$	x, y, z	xy, yz, xz

Other point groups which are of second class and contain $-E$. See Table 1.2.6.6(*a*).

Group	Isomorphism class	Rotation subgroup
$4/m$	$C_4 \times \mathbb{Z}_2$	4
$6/m$	$C_6 \times \mathbb{Z}_2$	6
mmm	$D_2 \times \mathbb{Z}_2$	222
$4/mmm$	$D_4 \times \mathbb{Z}_2$	422
$6/mmm$	$D_6 \times \mathbb{Z}_2$	622
$m\bar{3}$	$T \times \mathbb{Z}_2$	23
$m\bar{3}m$	$O \times \mathbb{Z}_2$	432

Table 1.2.6.6. *Direct products with* $\{E, \bar{1}\}$ *and* $\{E, 1'\}$

(*a*) With $\{E, \bar{1}\}$.

$K \times \mathbb{Z}_2$	$R \in K$	$\bar{R}$
Γ_g	$\chi(R)$	$\chi(R)$
Γ_u	$\chi(R)$	$-\chi(R)$

$4/m$	$C_4 \times \mathbb{Z}_2$	*cf.* 4
$6/m$	$C_6 \times \mathbb{Z}_2$	*cf.* 6
mmm	$D_2 \times \mathbb{Z}_2$	*cf.* 222
$4/mmm$	$D_4 \times \mathbb{Z}_2$	*cf.* 422
$6/mmm$	$D_6 \times \mathbb{Z}_2$	*cf.* 622
$m\bar{3}$	$T \times \mathbb{Z}_2$	*cf.* 23
$m\bar{3}m$	$O \times \mathbb{Z}_2$	*cf.* 432

(*b*) With $\{E, 1'\}$.

$K \times \mathbb{Z}_2$	$R \in K$	R'
Γ_+	$\chi(R)$	$\chi(R)$
Γ_-	$\chi(R)$	$-\chi(R)$

$1'$	$C_1 \times \mathbb{Z}_2$	*cf.* 1
$21'$	$C_2 \times \mathbb{Z}_2$	*cf.* 2
$m1'$	$C_2 \times \mathbb{Z}_2$	*cf.* m
$2221'$	$D_2 \times \mathbb{Z}_2$	*cf.* 222
$2mm1'$	$D_2 \times \mathbb{Z}_2$	*cf.* $2mm$
$41'$	$C_4 \times \mathbb{Z}_2$	*cf.* 4
$\bar{4}1'$	$C_4 \times \mathbb{Z}_2$	*cf.* $\bar{4}$
$4mm1'$	$D_4 \times \mathbb{Z}_2$	*cf.* $4mm$
$4221'$	$D_4 \times \mathbb{Z}_2$	*cf.* 422
$\bar{4}2m1'$	$D_4 \times \mathbb{Z}_2$	*cf.* $\bar{4}2m$
$31'$	$C_3 \times \mathbb{Z}_2$	*cf.* 3
$321'$	$D_3 \times \mathbb{Z}_2$	*cf.* 32
$\bar{3}1'$	$C_6 \times \mathbb{Z}_2$	*cf.* $\bar{3}$
$3m1'$	$D_3 \times \mathbb{Z}_2$	*cf.* $3m$
$6mm1'$	$D_6 \times \mathbb{Z}_2$	*cf.* $6mm$
$61'$	$C_6 \times \mathbb{Z}_2$	*cf.* 6
$\bar{6}1'$	$C_6 \times \mathbb{Z}_2$	*cf.* $\bar{6}$
$6221'$	$D_6 \times \mathbb{Z}_2$	*cf.* 622
$\bar{6}2m1'$	$D_6 \times \mathbb{Z}_2$	*cf.* $\bar{6}2m$
$231'$	$T \times \mathbb{Z}_2$	*cf.* 23
$4321'$	$O \times \mathbb{Z}_2$	*cf.* 432
$\bar{4}3m1'$	$O \times \mathbb{Z}_2$	*cf.* $\bar{4}3m$

(*c*) With $\{E, \bar{1}\}$ and $\{E, 1'\}$.

$K \times \mathbb{Z}_2 \times \mathbb{Z}_2$	$R \in K$	$\bar{R}$	R'	$\bar{R}'$
Γ_{g+}	$\chi(R)$	$\chi(R)$	$\chi(R)$	$\chi(R)$
Γ_{u+}	$\chi(R)$	$-\chi(R)$	$\chi(R)$	$-\chi(R)$
Γ_{g-}	$\chi(R)$	$\chi(R)$	$-\chi(R)$	$-\chi(R)$
Γ_{u-}	$\chi(R)$	$-\chi(R)$	$-\chi(R)$	$\chi(R)$

$\bar{1}'$	$C_1 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 1
$21'/m$	$C_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 2
$4/m1'$	$C_4 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 4
$6/m1'$	$C_6 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 6
$mmm1'$	$D_2 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 222
$4/mmm1'$	$D_4 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 422
$\bar{3}m1'$	$D_6 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* $3m$
$6/mmm1'$	$D_6 \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 622
$m31'$	$T \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 23
$m(\bar{3})m1'$	$O \times \mathbb{Z}_2 \times \mathbb{Z}_2$	*cf.* 432

references