PG No. 15 $D_{4\mathrm{h}}$ $4/mmm$ [tetragonal]

* character table

$D_{4\mathrm{h}}$	$1(1)$	$2_{001}(1)$	$2_{100}(2)$	$2_{110}(2)$	$4^+_{001}(2)$	$-1(1)$	$\mathrm{m}_{001}(1)$	$\mathrm{m}_{100}(2)$	$\mathrm{m}_{110}(2)$	$-4^+_{001}(2)$
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}