

## Symmetry Classification for Serial Crystallography Experiments

Groups with white backgrounds are merohedral and will exhibit indexing ambiguities. Move directly downwards to the nearest cell with a shaded background to find the corresponding “source symmetry”.  
Do not cross thick black lines. Chiral groups are shown in bold, centrosymmetric groups are underlined.

Point Groups					Space Groups				
Triclinic lattice									
$\bar{1}$		<b>1</b>		$P\bar{1}$		<b>P1</b>			
Monoclinic lattice									
		m				Pm, Pc, Cm, Cc			
<b>2</b>		<u>2/m</u>		<b>P2, P2<sub>1</sub>, C2</b>		<u>P2/m, P2<sub>1</sub>/m, C2/m, P2/c, P2<sub>1</sub>/c, C2/c</u>			
Orthorhombic lattice									
		mm2				Pmm2, Pmc2 <sub>1</sub> , Pcc2, Pma2, Pca2 <sub>1</sub> , Pnc2, Pmn2 <sub>1</sub> , Pba2, Pna2 <sub>1</sub> , Pnn2, Cmm2, Cmc2 <sub>1</sub> , Ccc2, Amm2, Aem2, Ama2, Aea2, Fmm2, Fdd2, Imm2, Iba2, Ima2			
<b>222</b>		<u>mmm</u>		<b>P222, P222<sub>1</sub>, P2<sub>1</sub>2<sub>1</sub>2, P2<sub>1</sub>2<sub>1</sub>2<sub>1</sub>, C222<sub>1</sub>, C222, F222, I222, I2<sub>1</sub>2<sub>1</sub>2<sub>1</sub></b>		<u>Pmmm, Pnnn, Pccm, Pban, Pmma, Pnna, Pmna, Pcca, Pbam, Pccn, Pbcm, Pnnm, Pmmn, Pbcn, Pbca, Pnma, Cmcn, Cmce, Cmmm, Cccm, Cmme, Ccce, Fmmm, Fddd, Immm, Ibam, Ibca, Imma</u>			
Tetragonal lattice									
<b>4</b>	$\bar{4}$		4mm	<u>4/m</u>	<b>P4, P4<sub>1</sub>, P4<sub>2</sub>, P4<sub>3</sub>, I4, I4<sub>1</sub></b>	$P\bar{4}, I\bar{4}$		P4mm, P4bm, P4 <sub>2</sub> cm, P4 <sub>2</sub> nm, P4cc, P4nc, P4 <sub>2</sub> mc, P4 <sub>2</sub> bc, I4mm, I4cm, I4 <sub>1</sub> md, I4 <sub>1</sub> cd	<u>P4/m, P4<sub>2</sub>/m, P4/n, P4<sub>2</sub>/n, I4/m, I4<sub>1</sub>/a</u>
	$\bar{4}2m$	$\bar{4}m2$				$P\bar{4}2m, P\bar{4}2c, P\bar{4}2_1m, P\bar{4}2_1c, I\bar{4}2m, I\bar{4}2d$	$P\bar{4}m2, P\bar{4}c2, P\bar{4}b2, P\bar{4}n2, I\bar{4}m2, I\bar{4}c2$		
<b>422</b>	<u>4/mmm</u>				<b>P422, P42<sub>1</sub>2, P4<sub>1</sub>22, P4<sub>1</sub>2<sub>1</sub>2, P4<sub>2</sub>22, P4<sub>2</sub>2<sub>1</sub>2, P4<sub>3</sub>22, P4<sub>3</sub>2<sub>1</sub>2, I422, I4<sub>1</sub>22</b>	<u>P4/mmm, P4/mcc, P4/nbm, P4/nnc, P4/mbm, P4/mnc, P4/nmm, P4/ncc, P4<sub>2</sub>/mmc, P4<sub>2</sub>/mcm, P4<sub>2</sub>/nbc, P4<sub>2</sub>/nnm, P4<sub>2</sub>/mbc, P4<sub>2</sub>/mnm, P4<sub>2</sub>/nmc, P4<sub>2</sub>/ncm, I4/mmm, I4/mcm, I4<sub>1</sub>/amd, I4<sub>1</sub>/acd</u>			

Rhombohedral lattice

3	$\bar{3}$	3m	R3 (H3)	$R\bar{3}$ (H $\bar{3}$ )	R3m (H3m), R3c (H3c)
32	$\bar{3}m$		R32 (H32)	$R\bar{3}m$ (H $\bar{3}m$ ), $R\bar{3}c$ (H $\bar{3}c$ )	

Hexagonal lattice

6	3		$\bar{3}$				6mm	$\underline{6/m}$	$P6, P6_1,$ $P6_5,$ $P6_2,$ $P6_4, P6_3$	$P3, P3_1, P3_2$		$P\bar{3}$				P6mm, P6cc, $P6_3$ cm, P6 <sub>3</sub> mc	$\underline{P6/m},$ $\underline{P6_3/m}$	
	312	321								$P312,$ $P3_112,$ $P3_212$	$P321,$ $P3_121,$ $P3_221$	$P3m1,$ $P3c1$		$P\bar{6}$	$P31m,$ $P31c$			
			$\underline{3m1}$	$\bar{6}m2$	$\bar{6}2m$	$\bar{3}1m$						$\underline{P3m1},$ $\underline{P3c1}$	$P\bar{6}m2,$ $P\bar{6}c2$	$P\bar{6}2m,$ $P\bar{6}2c$	$\underline{P31m},$ $\underline{P31c}$			
622		$\underline{6/mmm}$						$P622, P6_122, P6_522, P6_222,$ $P6_422, P6_322$		$\underline{P6/mmm}, \underline{P6/mcc}, \underline{P6_3/mcm}, \underline{P6_3/mmc}$								

Cubic lattice

23	$\bar{4}32$	$m\bar{3}$	P23, F23, I23, P2 <sub>1</sub> 3, I2 <sub>1</sub> 3	$P\bar{4}3m, F\bar{4}3m, I\bar{4}3m, P\bar{4}3n, F\bar{4}3c, I\bar{4}3d$	$Pm\bar{3}, Pn\bar{3}, Fm\bar{3}, Fd\bar{3}, Im\bar{3}, Pa\bar{3}, Ia\bar{3}$
432	$m\bar{3}m$		P432, P4 <sub>2</sub> 32, F432, F4 <sub>1</sub> 32, I432, P4 <sub>3</sub> 32, P4 <sub>1</sub> 32, I4 <sub>1</sub> 32	$Pm\bar{3}m, Pn\bar{3}n, Pm\bar{3}n, Pn\bar{3}m, Fm\bar{3}m, Fm\bar{3}c, Fd\bar{3}m, Fd\bar{3}c, Im\bar{3}m, Ia\bar{3}d$	

Laue Classes

$\bar{1}$	$\bar{1}$			
$2/m$	2	m		
mmm	222	mm2		
$4/m$	4	$\bar{4}$		
$4/mmm$	422	$\bar{4}2m$	$\bar{4}m2$	4mm

$\bar{3}$	3	
$\bar{3}m$	32	3m
$\bar{3}m1$	321	3m1
$\bar{3}1m$	312	31m

$6/m$	6	$\bar{6}$	
$6/mmm$	622	$\bar{6}m2$	$\bar{6}2m$ 6mm
$m\bar{3}$	23		
$m\bar{3}m$	432	$\bar{4}32$	