

Laue class  $D_{4h} - 4/mmm$ 

6. SCANNING TABLES

Tetragonal

 No. 126  $P4/nnc$ 

$$\mathcal{G} = P_{nnc}^4 \frac{2_1}{c} \text{ origin 2}$$

 $D_{4h}^4$ 

Orientation orbit ( <i>hkl</i> )	Conventional basis of the scanning group <b>a'</b> <b>b'</b> <b>d</b>	Scanning group $\mathcal{H}$	Linear orbit <b>sd</b>	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
(001)	<b>a</b> <b>b</b> <b>c</b>	$P4/nnc$ (origin 2)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p4/n [(\mathbf{a} + \mathbf{b})/4]$ $p422 [(\mathbf{a} + \mathbf{b})/4]$ $p4 [(\mathbf{a} + \mathbf{b})/4]$	L52 L53 L49
(100) (010)	<b>b</b> <b>c</b> <b>a</b> <b>-a</b> <b>c</b> <b>b</b>	$Pnmm$ (origin 2)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p112/n$ $p222 [(\mathbf{a}' + \mathbf{b}')/4]$ $p112 [(\mathbf{a}' + \mathbf{b}')/4]$	L07 L19 L03
(110)  (1 $\bar{1}$ 0)	<b>(-a+b)</b> <b>c</b> <b>(a+b)</b> <b>(a+b)</b> <b>c</b> <b>(a-b)</b>	$Bbcb$ (or. 1) $[(\mathbf{b}' + \mathbf{d})/4]$ or $Bbcb$ (or. 2) $[(\mathbf{a}' + \mathbf{d})/4]$ $Bbcb$ (or. 1) $[(\mathbf{a}' + \mathbf{b}')/4]$ or $Bbcb$ (or. 2)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$ $[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pbab$ $pban (\mathbf{a}'/4)$ $pba2 (\mathbf{b}'/4)$ $pban$ $pbab (\mathbf{a}'/4)$ $pba2 [(\mathbf{a}' + \mathbf{b}')/4]$	L43 L39 L25 L39 L43 L25

 No. 127  $P4/mbm$ 

$$\mathcal{G} = P_{mbm}^4 \frac{2_1}{b} \frac{2}{m}$$

 $D_{4h}^5$ 

Orientation orbit ( <i>hkl</i> )	Conventional basis of the scanning group <b>a'</b> <b>b'</b> <b>d</b>	Scanning group $\mathcal{H}$	Linear orbit <b>sd</b>	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
(001)	<b>a</b> <b>b</b> <b>c</b>	$P4/mbm$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[s\mathbf{d}, -s\mathbf{d}]$	$p4/mbm$ $p4bm$	L63 L56
(100) (010)	<b>b</b> <b>c</b> <b>a</b> <b>-a</b> <b>c</b> <b>b</b>	$Pcma$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p12/m1$ $p2_1ma$ $p1m1$	L14 L28 L11
(110) (1 $\bar{1}$ 0)	<b>(-a+b)</b> <b>c</b> <b>(a+b)</b> <b>(a+b)</b> <b>c</b> <b>(a-b)</b>	$Bmmm$ $[(\mathbf{a}' + \mathbf{d})/4]$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pmma$ $pmmm (\mathbf{a}'/4)$ $pmm2 (\mathbf{a}'/4)$	L41 L37 L23

 No. 128  $P4/mnc$ 

$$\mathcal{G} = P_{mnc}^4 \frac{2_1}{n} \frac{2}{c}$$

 $D_{4h}^6$ 

Orientation orbit ( <i>hkl</i> )	Conventional basis of the scanning group <b>a'</b> <b>b'</b> <b>d</b>	Scanning group $\mathcal{H}$	Linear orbit <b>sd</b>	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
(001)	<b>a</b> <b>b</b> <b>c</b>	$P4/mnc$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p4/m$ $p42_12$ $p4$	L51 L54 L49
(100) (010)	<b>b</b> <b>c</b> <b>a</b> <b>-a</b> <b>c</b> <b>b</b>	$Pnmm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p12/m1$ $p2_1mn$ $p1m1$	L14 L32 L11
(110) (1 $\bar{1}$ 0)	<b>(-a+b)</b> <b>c</b> <b>(a+b)</b> <b>(a+b)</b> <b>c</b> <b>(a-b)</b>	$Bbmb$ $[(\mathbf{a}' + \mathbf{d})/4]$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pbmn$ $pbmb (\mathbf{a}'/4)$ $pbm2 [(\mathbf{a}' + \mathbf{b}')/4]$	L42 L38 L24

No. 142  $I4_1/acd$

$$\mathcal{G} = I_{a \ c \ d}^{4 \ 2 \ 2} \text{ origin } 2$$

$D_{4h}^{20}$

Orientation orbit ( <i>hkl</i> )	Conventional basis of the scanning group <b>a'</b> <b>b'</b> <b>d</b>	Scanning group $\mathcal{H}$	Linear orbit <b>sd</b>	Sectional layer group $\mathcal{L}(sd)$	
(001)	<b>a</b> <b>b</b> <b>c</b>	$I4_1/acd$ (origin 2)	$[0d, \frac{1}{2}d;$ $\frac{1}{4}d, \frac{3}{4}d]$ $[\frac{1}{8}d, \frac{5}{8}d;$ $\frac{3}{8}d, \frac{7}{8}d]$ $[\pm sd, (\pm s + \frac{1}{4})d,$ $(\pm s + \frac{1}{2})d, (\pm s + \frac{3}{4})d]$	<i>pbab</i> <i>pbaa</i> [( <b>a</b> + <b>b</b> )/4] <i>p<math>\bar{4}</math>b2</i> (3 <b>b</b> /4) <i>p<math>\bar{4}</math>b2</i> ( <b>b</b> /4) <i>pba2</i> ( <b>b</b> /4)	L43 L43 L60 L60 L25
(100)	<b>b</b> <b>c</b> <b>a</b>	<i>Ibca</i>	$[0d, \frac{1}{2}d]$ $[\frac{1}{4}d, \frac{3}{4}d]$ $[\pm sd, (\pm s + \frac{1}{2})d]$	<i>pbab</i> <i>pbaa</i> [( <b>a'</b> + <b>b'</b> )/4] <i>pba2</i> ( <b>b'</b> /4)	L43 L43 L25
(010)	<b>-a</b> <b>c</b> <b>b</b>	<i>Ibca</i> [( <b>a'</b> + <b>b'</b> + <b>d</b> )/4]	$[0d, \frac{1}{2}d]$ $[\frac{1}{4}d, \frac{3}{4}d]$ $[\pm sd, (\pm s + \frac{1}{2})d]$	<i>pbaa</i> <i>pbab</i> [( <b>a'</b> + <b>b'</b> )/4] <i>pba2</i> ( <b>a'</b> /4)	L43 L43 L25
(110)	<b>(-a+b)</b> <b>c</b> <b>(a+b)</b>	<i>Fddd</i> (or. 1) [3( <b>a'</b> + <b>b'</b> + <b>d</b> )/8] or <i>Fddd</i> (or. 2)	$[0d, \frac{1}{2}d;$ $\frac{1}{4}d, \frac{3}{4}d]$ $[\frac{1}{8}d, \frac{5}{8}d;$ $\frac{3}{8}d, \frac{7}{8}d]$ $[\pm sd, (\pm s + \frac{1}{4})d;$ $(\pm s + \frac{1}{2})d, (\pm s + \frac{3}{4})d]$	$\widehat{p}112/b$ $\widehat{p}112/a$ ( <b>a'</b> /4 or <b>b'</b> /4) <i>c222</i> [( <b>a'</b> + <b>b'</b> )/8] <i>c222</i> [3( <b>a'</b> + <b>b'</b> )/8]	L16 L16 L22 L22
( $\bar{1}\bar{1}0$ )	<b>(a+b)</b> <b>c</b> <b>(a-b)</b>	<i>Fddd</i> (or. 1) [( <b>a'</b> + <b>b'</b> + 3 <b>d</b> )/8] or <i>Fddd</i> (or. 2) [( <b>a'</b> + <b>b'</b> )/4]	$[0d, \frac{1}{2}d;$ $\frac{1}{4}d, \frac{3}{4}d]$ $[\frac{1}{8}d, \frac{5}{8}d;$ $\frac{3}{8}d, \frac{7}{8}d]$ $[\pm sd, (\pm s + \frac{1}{4})d;$ $(\pm s + \frac{1}{2})d, (\pm s + \frac{3}{4})d]$	$\widehat{p}112/b$ $\widehat{p}112/a$ ( <b>a'</b> /4 or <b>b'</b> /4) <i>c222</i> [3( <b>a'</b> + <b>b'</b> )/8] <i>c222</i> [( <b>a'</b> + <b>b'</b> )/8] $\widehat{p}112$ [( <b>a'</b> + <b>b'</b> )/8]	L16 L16 L22 L22 L03

Auxiliary tables for Laue class  $D_{4h} - 4/mmm$

Centring type *P*

Orientation orbit ( <i>hkl</i> )	Conventional basis of the scanning group <b>a'</b> <b>b'</b> <b>d</b>			Auxiliary basis of the scanning group $\widehat{\mathbf{a}}$ $\widehat{\mathbf{b}}$ $\widehat{\mathbf{c}}$		
( <i>mn</i> 0)	<b>c</b>	<b>na - mb</b>	<b>pa + qb</b>	<b>a</b>	<b>b</b>	<b>c</b>
( $\bar{m}$ <i>n</i> 0)	<b>c</b>	<b>ma + nb</b>	<b>-qa + pb</b>			
( $\bar{m}$ $\bar{n}$ 0)	<b>c</b>	<b>na + mb</b>	<b>-pa + qb</b>			
( <i>nm</i> 0)	<b>c</b>	<b>ma - nb</b>	<b>qa + pb</b>			
(0 <i>mn</i> )	<b>a</b>	<b>nb - mc</b>	<b>pb + qc</b>	<b>b</b>	<b>c</b>	<b>a</b>
(0 $\bar{m}$ <i>n</i> )	<b>a</b>	<b>nb + mc</b>	<b>-pb + qc</b>			
( <i>m</i> 0 <i>n</i> )	<b>b</b>	<b>mc - na</b>	<b>qc + pa</b>	<b>c</b>	<b>a</b>	<b>b</b>
( <i>m</i> 0 $\bar{n}$ )	<b>b</b>	<b>mc + na</b>	<b>-qc + pa</b>			
( <i>hhl</i> )	<b>a - b</b>	<b>n(a + b) - mc</b>	<b>p(a + b) + qc</b>	<b>a + b</b>	<b>c</b>	<b>a - b</b>
( $\bar{h}$ <i>hl</i> )	<b>a - b</b>	<b>n(a + b) + mc</b>	<b>-p(a + b) + qc</b>			
( <i>h<math>\bar{h}</math><i>l</i>)</i>	<b>a + b</b>	<b>n(b - a) - mc</b>	<b>p(b - a) + qc</b>	<b>b - a</b>	<b>c</b>	<b>a + b</b>
( $\bar{h}$ $\bar{h}$ <i>l</i> )	<b>a + b</b>	<b>n(b - a) + mc</b>	<b>-p(b - a) + qc</b>			

$l$  odd  $\Rightarrow n = l, m = 2h; l$  even  $\Rightarrow n = l/2, m = h$

Arithmetic class  $4/mmmP$ 

Serial No. Group type Group	123	124	125		126	
	$D_{4h}^1$ $P4/mmm$	$D_{4h}^2$ $P4/mcc$	$D_{4h}^3$ $P4/mbm$		$D_{4h}^4$ $P4/nnc$	
			Origin 1	Origin 2	Origin 1	Origin 2
$(mn0)$ $(\bar{m}m0)$ $(\bar{m}n0)$ $(nm0)$	$P112/m$	$P112/m$	$P112/n$ $(a+b)/4$	$P112/n$	$P112/n$ $(a+b+c)/4$	$P112/n$
$(0mn)$ $(0\bar{m}n)$ $(m0n)$ $(m0\bar{n})$	$P112/m$	$P112/b$ $P112/a$	$P112/a$ $(a+b)/4$ $P112/b$ $(a+b)/4$	$P112/a$ $P112/b$	$P112/n$ $(a+b+c)/4$	$P112/n$
$(hhl)$ $(\bar{h}hl)$ $(h\bar{h}l)$ $(\bar{h}hl)$	$B112/m$	$B112/b$	$B112/m$ $(a-b)/4$ $B112/m$ $(a+b)/4$	$B112/m$ $(a/2 \text{ or } b/2)$ $B112/m$	$B112/b$ $(a-b+c)/4$ $B112/b$ $(a+b+c)/4$	$B112/b$ $(a/2 \text{ or } b/2)$ $B112/b$

Serial No. Group type Group	127	128	129		130	
	$D_{4h}^5$ $P4/mbm$	$D_{4h}^6$ $P4/mnc$	$D_{4h}^7$ $P4/nmm$		$D_{4h}^8$ $P4/ncc$	
			Origin 1	Origin 2	Origin 1	Origin 2
$(mn0)$ $(\bar{m}m0)$ $(\bar{m}n0)$ $(nm0)$	$P112/m$	$P112/m$	$P112/n$ $(a+b)/4$	$P112/n$	$P112/n$ $(a+b)/4$	$P112/n$
$(0mn)$ $(0\bar{m}n)$ $(m0n)$ $(m0\bar{n})$	$P112_1/a$ $P112_1/b$	$P112_1/n$	$P112_1/m$ $(a+b)/4$	$P112_1/m$	$P112_1/b$ $(a+b)/4$ $P112_1/a$ $(a+b)/4$	$P112_1/b$ $P112_1/a$
$(hhl)$ $(\bar{h}hl)$ $(h\bar{h}l)$ $(\bar{h}hl)$	$B112/m$ $(a/2 \text{ or } b/2)$	$B112/b$ $(a/2 \text{ or } b/2)$	$B112/m$ $(a-b)/4$ $B112/m$ $(a+b)/4$	$B112/m$ $B112/m$ $(a/2 \text{ or } b/2)$	$B112/b$ $(a-b)/4$ $B112/b$ $(a+b)/4$	$B112/b$ $B112/b$ $(a/2 \text{ or } b/2)$

Serial No. Group type Group	131	132	133		134	
	$D_{4h}^9$ $P4_2/mmc$	$D_{4h}^{10}$ $P4_2/mcm$	$D_{4h}^{11}$ $P4_2/nbc$		$D_{4h}^{12}$ $P4_2/nmm$	
			Origin 1	Origin 2	Origin 1	Origin 2
$(mn0)$ $(\bar{m}m0)$ $(\bar{m}n0)$ $(nm0)$	$P112/m$	$P112/m$	$P112/n$ $(a+b+c)/4$	$P112/n$	$P112/n$ $(a+b+c)/4$	$P112/n$
$(0mn)$ $(0\bar{m}n)$ $(m0n)$ $(m0\bar{n})$	$P112/m$	$P112/b$ $P112/a$	$P112/a$ $(a+b+c)/4$ $P112/b$ $(a+b+c)/4$	$P112/a$ $P112/b$	$P112/n$ $(a+b+c)/4$	$P112/n$
$(hhl)$ $(\bar{h}hl)$ $(h\bar{h}l)$ $(\bar{h}hl)$	$B112/b$	$B112/m$	$B112/b$ $(a-b+c)/4$ $B112/b$ $(a+b+c)/4$	$B112/b$ $(a/2 \text{ or } b/2)$ $B112/b$	$B112/m$ $(a-b+c)/4$ $B112/m$ $(a+b+c)/4$	$B112/m$ $(a/2 \text{ or } b/2)$ $B112/m$