

Tetragonal

6. SCANNING TABLES

Laue class $D_{4h} - 4/mmm$ Geometric class $C_{4v} - 4mm$ No. 99 $P4mm$ C_{4v}^1 $\mathcal{G} = P4mm$

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group a' b' d			Scanning group $\mathcal{H}$	Linear orbit sd	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
(001)	a	b	c	$P4mm$	sd	$p4mm$	L55
(100)	b	c	a	$Pm2m$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$	$pm2m$	L27
(010)	$-\mathbf{a}$	c	b		$[\mathbf{sd}, -\mathbf{sd}]$	$pm11$	L11
(110)	$(-\mathbf{a}+\mathbf{b})$	c	$(\mathbf{a}+\mathbf{b})$	$Bm2m$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pm2m$	L27
(1 $\bar{1}$ 0)	$(\mathbf{a}+\mathbf{b})$	c	$(\mathbf{a}-\mathbf{b})$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pm2a (\mathbf{a}'/4)$ $pm11$	L31 L11

No. 100 $P4bm$ C_{4v}^2 $\mathcal{G} = P4bm$

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group a' b' d			Scanning group $\mathcal{H}$	Linear orbit sd	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
(001)	a	b	c	$P4bm$	sd	$p4bm$	L55
(100)	b	c	a	$Pc2a$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p121$	L08
(010)	$-\mathbf{a}$	c	b		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p11a$ $p1$	L05 L01
(110)	$(-\mathbf{a}+\mathbf{b})$	c	$(\mathbf{a}+\mathbf{b})$	$Bm2m$ $[(\mathbf{a}'+\mathbf{d})/4]$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pm2a$	L31
(1 $\bar{1}$ 0)	$(\mathbf{a}+\mathbf{b})$	c	$(\mathbf{a}-\mathbf{b})$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pm2m (\mathbf{a}'/4)$ $pm11 (\mathbf{a}'/4)$	L27 L11

No. 101 $P4_2cm$ C_{4v}^3 $\mathcal{G} = P4_2cm$

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group a' b' d			Scanning group $\mathcal{H}$	Linear orbit sd	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
(001)	a	b	c	$P4_2cm$	$[\mathbf{sd}, (s + \frac{1}{2})\mathbf{d}]$	$\widehat{c}mm2$	L26
(100)	b	c	a	$Pb2b$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$	$pb2b$	L30
(010)	$-\mathbf{a}$	c	b		$[\mathbf{sd}, -\mathbf{sd}]$	$pb11$	L12
(110)	$(-\mathbf{a}+\mathbf{b})$	c	$(\mathbf{a}+\mathbf{b})$	$Bm2m$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pm2m$	L27
(1 $\bar{1}$ 0)	$(\mathbf{a}+\mathbf{b})$	c	$(\mathbf{a}-\mathbf{b})$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pm2a (\mathbf{a}'/4)$ $pm11$	L31 L11

No. 142 $I4_1/acd$

$$\mathcal{G} = I_{\frac{1}{a} \frac{2}{c} \frac{2}{d}}^4 \text{ origin } 2$$

 D_{4h}^{20}

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

Auxiliary tables for Laue class $D_{4h} - 4/mmm$ Centring type *P*

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group a' b' d			Auxiliary basis of the scanning group $\widehat{\mathbf{a}}$ $\widehat{\mathbf{b}}$ $\widehat{\mathbf{c}}$		
(<i>mn</i> 0)	c	<i>na</i> - <i>mb</i>	<i>pa</i> + <i>qb</i>	a	b	c
($\bar{m}$ <i>n</i> 0)	c	<i>ma</i> + <i>nb</i>	- <i>qa</i> + <i>pb</i>			
($\bar{m}$ <i>n</i> 0)	c	<i>na</i> + <i>mb</i>	- <i>pa</i> + <i>qb</i>			
(<i>nm</i> 0)	c	<i>ma</i> - <i>nb</i>	<i>qa</i> + <i>pb</i>			
(0 <i>mn</i>)	a	<i>nb</i> - <i>mc</i>	<i>pb</i> + <i>qc</i>	b	c	a
(0 $\bar{m}$ <i>n</i>)	a	<i>nb</i> + <i>mc</i>	- <i>pb</i> + <i>qc</i>			
(<i>m</i> 0 <i>n</i>)	b	<i>mc</i> - <i>na</i>	<i>qc</i> + <i>pa</i>	c	a	b
(<i>m</i> 0 $\bar{n}$)	b	<i>mc</i> + <i>na</i>	- <i>qc</i> + <i>pa</i>			
(<i>hhl</i>)	a - b	<i>n</i> (a + b) - <i>mc</i>	<i>p</i> (a + b) + <i>qc</i>	a + b	c	a - b
($\bar{h}$ <i>hl</i>)	a - b	<i>n</i> (a + b) + <i>mc</i>	- <i>p</i> (a + b) + <i>qc</i>			
(<i>h$\bar{h}$<i>l</i>)</i>	a + b	<i>n</i> (b - a) - <i>mc</i>	<i>p</i> (b - a) + <i>qc</i>	b - a	c	a + b
($\bar{h}$ <i>hl</i>)	a + b	<i>n</i> (b - a) + <i>mc</i>	- <i>p</i> (b - a) + <i>qc</i>			
<i>l</i> odd $\Rightarrow n = l, m = 2h$; <i>l</i> even $\Rightarrow n = l/2, m = h$						

Arithmetic class $422P$

Serial No.	89	90	91	92	93	94	95	96
Group type	D_4^1	D_4^2	D_4^3	D_4^4	D_4^5	D_4^6	D_4^7	D_4^8
Group	$P422$	$P4_212$	$P4_122$	$P4_12_12$	$P4_222$	$P4_22_12$	$P4_322$	$P4_32_12$
$(mn0)$	$P112$	$P112$	$P112_1$	$P112_1$	$P112$	$P112$	$P112_1$	$P112_1$
$(\bar{n}m0)$								
$(\bar{m}n0)$								
$(nm0)$								
$(0mn)$	$P112$	$P112_1$	$P112$	$P112_1$	$P112$	$P112_1$	$P112$	$P112_1$
$(0\bar{m}n)$		$(b/4)$	$(c/4)$	$(b/4 + 3c/8)$		$(b + c)/4$	$(c/4)$	$(b/4 + c/8)$
$(m0n)$		$P112_1$	$P112$	$P112_1$		$P112_1$	$P112$	$P112_1$
$(m0\bar{n})$		$(a/4)$		$(a/4 + c/8)$		$(a + c)/4$		$(a/4 + 3c/8)$
(hhl)	$B112$	$B112$	$B112$	$B112$	$B112$	$B112$	$B112$	$B112$
$(\bar{h}hl)$			$(c/8)$	$(c/4)$	$(c/4)$		$(3c/8)$	$(c/4)$
$(h\bar{h}l)$			$B112$	$B112$			$B112$	$B112$
$(\bar{h}\bar{h}l)$			$(3c/8)$				$(c/8)$	

Arithmetic class $4mmP$

Serial No.	99	100	101	102	103	104	105	106
Group type	C_{4v}^1	C_{4v}^2	C_{4v}^3	C_{4v}^4	C_{4v}^5	C_{4v}^6	C_{4v}^7	C_{4v}^8
Group	$P4mm$	$P4bm$	$P4_2cm$	$P4_2nm$	$P4cc$	$P4nc$	$P4_2mc$	$P4_2bc$
$(mn0)$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$
$(\bar{n}m0)$								
$(\bar{m}n0)$								
$(nm0)$								
$(0mn)$	$P11m$	$P11a$	$P11b$	$P11n$	$P11b$	$P11n$	$P11m$	$P11a$
$(0\bar{m}n)$		$(a/4)$						$(a/4)$
$(m0n)$		$P11b$	$P11a$		$P11a$			$P11b$
$(m0\bar{n})$		$(b/4)$						$(b/4)$
(hhl)	$B11m$	$B11m$	$B11m$	$B11m$	$B11b$	$B11b$	$B11b$	$B11b$
$(\bar{h}hl)$		$(a - b)/4$				$(a - b)/4$		$(a - b)/4$
$(h\bar{h}l)$		$B11m$				$B11b$		$B11b$
$(\bar{h}\bar{h}l)$		$(a + b)/4$				$(a + b)/4$		$(a + b)/4$

Arithmetic classes $\bar{4}2mP$ and $\bar{4}m2P$

Serial No.	111	112	113	114	115	116	117	118
Group type	D_{2d}^1	D_{2d}^2	D_{2d}^3	D_{2d}^4	D_{2d}^5	D_{2d}^6	D_{2d}^7	D_{2d}^8
Group	$P\bar{4}2m$	$P\bar{4}2c$	$P\bar{4}2_1m$	$P\bar{4}2_1c$	$P\bar{4}m2$	$P\bar{4}c2$	$P\bar{4}b2$	$P\bar{4}n2$
$(mn0)$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$
$(\bar{n}m0)$								
$(\bar{m}n0)$								
$(nm0)$								
$(0mn)$	$P112$	$P112$	$P112_1$	$P112_1$	$P11m$	$P11b$	$P11a$	$P11n$
$(0\bar{m}n)$		$(c/4)$	$(b/4)$	$(b + c)/4$			$(a/4)$	$(a/4)$
$(m0n)$			$P112_1$	$P112_1$		$P11a$	$P11b$	$P11n$
$(m0\bar{n})$			$(a/4)$	$(a + c)/4$			$(b/4)$	$(b/4)$
(hhl)	$B11m$	$B11b$	$B11m$	$B11b$	$B112$	$B112$	$B112$	$B112$
$(\bar{h}hl)$			$(a - b)/4$	$(a - b)/4$		$(c/4)$	$(a + b)/4$	$(a + b + c)/4$
$(h\bar{h}l)$			$B11m$	$B11b$			$B112$	$B112$
$(\bar{h}\bar{h}l)$			$(a + b)/4$	$(a + b)/4$			$(a - b)/4$	$(a - b + c)/4$