

Tetragonal

6. SCANNING TABLES

Laue class $D_{4h} - 4/mmm$ No. 115 $P\bar{4}m2$

$$\mathcal{G} = P\bar{4}m2$$

 D_{2d}^5

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group			Scanning group \mathcal{H}	Linear orbit \mathbf{sd}	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
	\mathbf{a}'	\mathbf{b}'	\mathbf{d}				
(001)	\mathbf{a}	\mathbf{b}	\mathbf{c}	$P\bar{4}m2$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[\mathbf{sd}, -\mathbf{sd}]$	$p\bar{4}m2$ $pmm2$	L59 L23
(100)	\mathbf{b}	\mathbf{c}	\mathbf{a}	$Pm2m$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[\mathbf{sd}, -\mathbf{sd}]$	$pm2m$ $pm11$	L27 L11
(010)	$-\mathbf{a}$	\mathbf{c}	\mathbf{b}				
(110)	$(-\mathbf{a}+\mathbf{b})$	\mathbf{c}	$(\mathbf{a}+\mathbf{b})$	$B222$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p222$ $p2_122$ $p112$	L19 L20 L03
($1\bar{1}0$)	$(\mathbf{a}+\mathbf{b})$	\mathbf{c}	$(\mathbf{a}-\mathbf{b})$				

No. 116 $P\bar{4}c2$

$$\mathcal{G} = P\bar{4}c2$$

 D_{2d}^6

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group			Scanning group \mathcal{H}	Linear orbit \mathbf{sd}	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
	\mathbf{a}'	\mathbf{b}'	\mathbf{d}				
(001)	\mathbf{a}	\mathbf{b}	\mathbf{c}	$P\bar{4}c2$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p\bar{4}$ $\widehat{c}222$ $p112$	L50 L22 L03
(100)	\mathbf{b}	\mathbf{c}	\mathbf{a}	$Pb2b$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[\mathbf{sd}, -\mathbf{sd}]$	$pb2b$ $pb11$	L30 L12
(010)	$-\mathbf{a}$	\mathbf{c}	\mathbf{b}				
(110)	$(-\mathbf{a}+\mathbf{b})$	\mathbf{c}	$(\mathbf{a}+\mathbf{b})$	$B222$ $(\mathbf{b}'/4)$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p222 (\mathbf{b}'/4)$ $p2_122 (\mathbf{b}'/4)$ $p112 (\mathbf{b}'/4)$	L19 L20 L03
($1\bar{1}0$)	$(\mathbf{a}+\mathbf{b})$	\mathbf{c}	$(\mathbf{a}-\mathbf{b})$				

No. 117 $P\bar{4}b2$

$$\mathcal{G} = P\bar{4}b2$$

 D_{2d}^7

Orientation orbit (<i>hkl</i>)	Conventional basis of the scanning group			Scanning group \mathcal{H}	Linear orbit \mathbf{sd}	Sectional layer group $\mathcal{L}(\mathbf{sd})$	
	\mathbf{a}'	\mathbf{b}'	\mathbf{d}				
(001)	\mathbf{a}	\mathbf{b}	\mathbf{c}	$P\bar{4}b2$	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[\mathbf{sd}, -\mathbf{sd}]$	$p\bar{4}b2$ $pba2$	L60 L25
(100)	\mathbf{b}	\mathbf{c}	\mathbf{a}	$Pc2a$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p121$ $p11a$ $p1$	L08 L05 L01
(010)	$-\mathbf{a}$	\mathbf{c}	\mathbf{b}				
(110)	$(-\mathbf{a}+\mathbf{b})$	\mathbf{c}	$(\mathbf{a}+\mathbf{b})$	$B222$ $[(\mathbf{a}'+\mathbf{d})/4]$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm\mathbf{sd}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p2_122 (\mathbf{a}'/4)$ $p222 (\mathbf{a}'/4)$ $p112 (\mathbf{a}'/4)$	L20 L19 L03
($1\bar{1}0$)	$(\mathbf{a}+\mathbf{b})$	\mathbf{c}	$(\mathbf{a}-\mathbf{b})$				

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 a' b' d	Scanning group \mathcal{H}	Linear orbit sd	Sectional layer group $\mathcal{L}(sd)$	
(001)	a b c	$I4_1/acd$ (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> [(a + b)/4] <i>p$\bar{4}$b2</i> (3 b /4) <i>p$\bar{4}$b2</i> (b /4) <i>pba2</i> (b /4)	L43 L43 L60 L60 L25
(100)	b c a	<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> [(a' + b')/4] <i>pba2</i> (b' /4)	L43 L43 L25
(010)	-a c b	<i>Ibca</i> [(a' + b' + d)/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> [(a' + b')/4] <i>pba2</i> (a' /4)	L43 L43 L25
(110)	(-a+b) c (a+b)	<i>Fddd</i> (or. 1) [3(a' + b' + d)/8] or <i>Fddd</i> (or. 2)	$[0d, \frac{1}{2}d;$ $\frac{1}{4}d, \frac{3}{4}d]$ $[\frac{1}{8}d, \frac{5}{8}d;$ $\frac{3}{8}d, \frac{7}{8}d]$ $[\pm sd, (\pm s + \frac{1}{4})d;$ $(\pm s + \frac{1}{2})d, (\pm s + \frac{3}{4})d]$	$\widehat{p}112/b$ $\widehat{p}112/a$ (a' /4 or b' /4) <i>c222</i> [(a' + b')/8] <i>c222</i> [3(a' + b')/8]	L16 L16 L22 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]	$[0d, \frac{1}{2}d;$ $\frac{1}{4}d, \frac{3}{4}d]$ $[\frac{1}{8}d, \frac{5}{8}d;$ $\frac{3}{8}d, \frac{7}{8}d]$ $[\pm sd, (\pm s + \frac{1}{4})d;$ $(\pm s + \frac{1}{2})d, (\pm s + \frac{3}{4})d]$	$\widehat{p}112/b$ $\widehat{p}112/a$ (a' /4 or b' /4) <i>c222</i> [3(a' + b')/8] <i>c222</i> [(a' + b')/8] $\widehat{p}112$ [(a' + 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 a' b' d			Auxiliary basis of the scanning group \widehat{a} \widehat{b} \widehat{c}		
(<i>mn</i> 0)	c	na - mb	pa + qb	a	b	c
(\bar{m} 0)	c	ma + nb	-qa + pb			
(\bar{m} 0)	c	na + mb	-pa + qb			
(<i>nm</i> 0)	c	ma - nb	qa + pb			
(0 <i>mn</i>)	a	nb - mc	pb + qc	b	c	a
(0 \bar{m} <i>n</i>)	a	nb + mc	-pb + qc			
(<i>m</i> 0 <i>n</i>)	b	mc - na	qc + pa	c	a	b
(<i>m</i> 0 \bar{n})	b	mc + na	-qc + pa			
(<i>hhl</i>)	a - b	n(a + b) - mc	p(a + b) + qc	a + b	c	a - b
(\bar{h} <i>hl</i>)	a - b	n(a + b) + mc	-p(a + b) + qc			
(<i>h\bar{h}<i>l</i>)</i>	a + b	n(b - a) - mc	p(b - a) + qc	b - a	c	a + b
(\bar{h} <i>hl</i>)	a + b	n(b - a) + mc	-p(b - a) + qc			

l odd $\Rightarrow n = l, m = 2h; l$ 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	$P422$	$P4_212$	$P4_122$	$P4_12_12$	$P4_222$	$P4_22_12$	$P4_322$	$P4_32_12$
$(mn0)$	$P112$	$P112$	$P112_1$	$P112_1$	$P112$	$P112$	$P112_1$	$P112_1$
$(\bar{m}00)$								
$(\bar{m}n0)$								
$(nm0)$								
$(0mn)$	$P112$	$P112_1$	$P112$	$P112_1$	$P112$	$P112_1$	$P112$	$P112_1$
$(0\bar{m}n)$		$(b/4)$	$(c/4)$	$(b/4 + 3c/8)$		$(b + c)/4$	$(c/4)$	$(b/4 + c/8)$
$(m0n)$		$P112_1$	$P112$	$P112_1$		$P112_1$	$P112$	$P112_1$
$(m0\bar{n})$		$(a/4)$		$(a/4 + c/8)$		$(a + c)/4$		$(a/4 + 3c/8)$
(hhl)	$B112$	$B112$	$B112$	$B112$	$B112$	$B112$	$B112$	$B112$
$(\bar{h}\bar{h}l)$			$(c/8)$	$(c/4)$	$(c/4)$		$(3c/8)$	$(c/4)$
$(h\bar{h}l)$			$B112$	$B112$			$B112$	$B112$
$(\bar{h}hl)$			$(3c/8)$				$(c/8)$	

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	$P4mm$	$P4bm$	$P4_2cm$	$P4_2nm$	$P4cc$	$P4nc$	$P4_2mc$	$P4_2bc$
$(mn0)$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$
$(\bar{m}00)$								
$(\bar{m}n0)$								
$(nm0)$								
$(0mn)$	$P11m$	$P11a$	$P11b$	$P11n$	$P11b$	$P11n$	$P11m$	$P11a$
$(0\bar{m}n)$		$(a/4)$						$(a/4)$
$(m0n)$		$P11b$	$P11a$		$P11a$			$P11b$
$(m0\bar{n})$		$(b/4)$						$(b/4)$
(hhl)	$B11m$	$B11m$	$B11m$	$B11m$	$B11b$	$B11b$	$B11b$	$B11b$
$(\bar{h}\bar{h}l)$		$(a - b)/4$				$(a - b)/4$		$(a - b)/4$
$(h\bar{h}l)$		$B11m$				$B11b$		$B11b$
$(\bar{h}hl)$		$(a + b)/4$				$(a + b)/4$		$(a + b)/4$

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	$P\bar{4}2m$	$P\bar{4}2c$	$P\bar{4}2_1m$	$P\bar{4}2_1c$	$P\bar{4}m2$	$P\bar{4}c2$	$P\bar{4}b2$	$P\bar{4}n2$
$(mn0)$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$	$P112$
$(\bar{m}00)$								
$(\bar{m}n0)$								
$(nm0)$								
$(0mn)$	$P112$	$P112$	$P112_1$	$P112_1$	$P11m$	$P11b$	$P11a$	$P11n$
$(0\bar{m}n)$		$(c/4)$	$(b/4)$	$(b + c)/4$			$(a/4)$	$(a/4)$
$(m0n)$			$P112_1$	$P112_1$		$P11a$	$P11b$	$P11n$
$(m0\bar{n})$			$(a/4)$	$(a + c)/4$			$(b/4)$	$(b/4)$
(hhl)	$B11m$	$B11b$	$B11m$	$B11b$	$B112$	$B112$	$B112$	$B112$
$(\bar{h}\bar{h}l)$			$(a - b)/4$	$(a - b)/4$		$(c/4)$	$(a + b)/4$	$(a + b + c)/4$
$(h\bar{h}l)$			$B11m$	$B11b$			$B112$	$B112$
$(\bar{h}hl)$			$(a + b)/4$	$(a + b)/4$			$(a - b)/4$	$(a - b + c)/4$