Tetragonal 6. SCANNING TABLES Laue class $D_{4h} - 4/mmm$

No. 129   P4/nmm D_{4h}^{7}

$$\mathcal{G} = P\frac{4}{n}\frac{2_1}{m}\frac{2}{m} \quad \text{origin 1}$$

Orientation orbit (hkl)	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**	P4/nmm (origin 1)	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[s\mathbf{d}, -s\mathbf{d}]$	p4/nmm (**a**/2 or **b**/2) p4mm (**a**/2 or **b**/2)	L64 L55
(100) (010)	**b** −**a**	**c** **c**	**a** **b**	Pmnm (origin 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	pm2m p2₁/m11 (**a′**/4) pm11	L27 L15 L11
(110) (1̄10)	(−**a**+**b**) (**a**+**b**)	**c** **c**	(**a**+**b**) (**a**−**b**)	Bmcm (**d**/4)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	pmaa (**a′**/4) pmam pma2	L38 L40 L24

No. 129   P4/nmm D_{4h}^{7}

$$\mathcal{G} = P\frac{4}{n}\frac{2_1}{m}\frac{2}{m} \quad \text{origin 2}$$

Orientation orbit (hkl)	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**	P4/nmm (origin 2)	$0\mathbf{d}, \frac{1}{2}\mathbf{d}$ $[s\mathbf{d}, -s\mathbf{d}]$	p4/nmm [(**a**+**b**)/4] p4mm [(**a**+**b**)/4]	L64 L55
(100) (010)	**b** −**a**	**c** **c**	**a** **b**	Pmnm (origin 2)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	p2₁/m11 pm2m (**a′**/4) pm11 (**a′**/4)	L15 L27 L11
(110)	(−**a**+**b**)	**c**	(**a**+**b**)	Bmcm [(**a′**+**d**)/4]	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	pmaa pmam (**a′**/4) pma2 (**a′**/4)	L38 L40 L24
(1̄10)	(**a**+**b**)	**c**	(**a**−**b**)	Bmcm	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	pmam pmaa (**a′**/4) pma2	L40 L38 L24

No. 130   P4/ncc D_{4h}^{8}

$$\mathcal{G} = P\frac{4}{n}\frac{2_1}{c}\frac{2}{c} \quad \text{origin 1}$$

Orientation orbit (hkl)	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**	P4/ncc (origin 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	p4/n (**a**/2 or **b**/2) p42₁2 (**a**/2 or **b**/2) p4 (**a**/2 or **b**/2)	L52 L54 L49
(100) (010)	**b** −**a**	**c** **c**	**a** **b**	Pbnb [(**a′**+**d**)/4]	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	pb2b p2₁/b11 (**a′**/4) pb11	L30 L17 L12
(110) (1̄10)	(−**a**+**b**) (**a**+**b**)	**c** **c**	(**a**+**b**) (**a**−**b**)	Bbcb (or. 1) (**b′**/4) or Bbcb (or. 2) (**a′**/4)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$ $[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$ $[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	pban (**a′**/4) pbab pba2 (**b′**/4)	L39 L43 L25

No. 142 $I4_1/acd$ D_{4h}^{20}

$$\mathcal{G} = I\tfrac{4_1}{a}\tfrac{2}{c}\tfrac{2}{d} \quad \text{origin 2}$$

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

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

Centring type P

Orientation orbit (hkl)	Conventional basis of the scanning group $\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	Auxiliary basis of the scanning group $\widehat{\mathbf{a}}$	$\widehat{\mathbf{b}}$	$\widehat{\mathbf{c}}$
$(mn0)$	$\mathbf{c}$	$n\mathbf{a}-m\mathbf{b}$	$p\mathbf{a}+q\mathbf{b}$	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$
$(\overline{n}m0)$	$\mathbf{c}$	$m\mathbf{a}+n\mathbf{b}$	$-q\mathbf{a}+p\mathbf{b}$			
$(\overline{m}n0)$	$\mathbf{c}$	$n\mathbf{a}+m\mathbf{b}$	$-p\mathbf{a}+q\mathbf{b}$			
$(nm0)$	$\mathbf{c}$	$m\mathbf{a}-n\mathbf{b}$	$q\mathbf{a}+p\mathbf{b}$			
$(0mn)$	$\mathbf{a}$	$n\mathbf{b}-m\mathbf{c}$	$p\mathbf{b}+q\mathbf{c}$	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$
$(0\overline{m}n)$	$\mathbf{a}$	$n\mathbf{b}+m\mathbf{c}$	$-p\mathbf{b}+q\mathbf{c}$			
$(m0n)$	$\mathbf{b}$	$m\mathbf{c}-n\mathbf{a}$	$q\mathbf{c}+p\mathbf{a}$	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$
$(m0\overline{n})$	$\mathbf{b}$	$m\mathbf{c}+n\mathbf{a}$	$-q\mathbf{c}+p\mathbf{a}$			
(hhl)	$\mathbf{a}-\mathbf{b}$	$n(\mathbf{a}+\mathbf{b})-m\mathbf{c}$	$p(\mathbf{a}+\mathbf{b})+q\mathbf{c}$	$\mathbf{a}+\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}-\mathbf{b}$
$(\overline{h}hl)$	$\mathbf{a}-\mathbf{b}$	$n(\mathbf{a}+\mathbf{b})+m\mathbf{c}$	$-p(\mathbf{a}+\mathbf{b})+q\mathbf{c}$			
$(h\overline{h}l)$	$\mathbf{a}+\mathbf{b}$	$n(\mathbf{b}-\mathbf{a})-m\mathbf{c}$	$p(\mathbf{b}-\mathbf{a})+q\mathbf{c}$	$\mathbf{b}-\mathbf{a}$	$\mathbf{c}$	$\mathbf{a}+\mathbf{b}$
$(\overline{h}hl)$	$\mathbf{a}+\mathbf{b}$	$n(\mathbf{b}-\mathbf{a})+m\mathbf{c}$	$-p(\mathbf{b}-\mathbf{a})+q\mathbf{c}$			
l odd $\Rightarrow n=l,\, m=2h$; l even $\Rightarrow n=l/2,\, m=h$						

Arithmetic class $4/mmmP$

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

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

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