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

No. 118 $P\overline{4}n2$ D_{2d}^8

$$\mathcal{G} = P\overline{4}n2$$

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)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	$P\overline{4}n2$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p\overline{4}$	L50
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$\widehat{c}222\ (\mathbf{a}/2\text{ or }\mathbf{b}/2)$	L22
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p112$	L03
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$	$Pn2n$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p121$	L08
(010)	$-\mathbf{a}$	$\mathbf{c}$	$\mathbf{b}$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p11n$	L05
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p1$	L01
(110)	$(-\mathbf{a}+\mathbf{b})$	$\mathbf{c}$	$(\mathbf{a}+\mathbf{b})$	$B222$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p2_122\ [(\mathbf{a}'+\mathbf{b}')/4]$	L20
(1$\overline{1}$0)	$(\mathbf{a}+\mathbf{b})$	$\mathbf{c}$	$(\mathbf{a}-\mathbf{b})$	$[(\mathbf{a}'+\mathbf{b}'+\mathbf{d})/4]$	$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p222\ [(\mathbf{a}'+\mathbf{b}')/4]$	L19
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$p112\ [(\mathbf{a}'+\mathbf{b}')/4]$	L03

No. 119 $I\overline{4}m2$ D_{2d}^9

$$\mathcal{G} = I\overline{4}m2$$

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)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	$I\overline{4}m2$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p\overline{4}m2$	L59
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p\overline{4}m2\ (\mathbf{a}/2\text{ or }\mathbf{b}/2)$	L59
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pmm2$	L23
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$	$Im2m$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pm2m$	L27
(010)	$-\mathbf{a}$	$\mathbf{c}$	$\mathbf{b}$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$pm2_1n$	L32
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pm11$	L11
(110)	$(-\mathbf{a}+\mathbf{b})$	$\mathbf{c}$	$(\mathbf{a}+\mathbf{b})$	$F222$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$c222$	L22
(1$\overline{1}$0)	$(\mathbf{a}+\mathbf{b})$	$\mathbf{c}$	$(\mathbf{a}-\mathbf{b})$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$c222\ [(\mathbf{a}'+\mathbf{b}')/4]$	L22
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$\widehat{p}112$	L03

No. 120 $I\overline{4}c2$ D_{2d}^{10}

$$\mathcal{G} = I\overline{4}c2$$

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)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	$I\overline{4}c2$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p\overline{4}b2$	L60
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p\overline{4}b2\ (\mathbf{a}/2\text{ or }\mathbf{b}/2)$	L60
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pba2$	L25
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$	$Ic2a$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pb2b$	L30
(010)	$-\mathbf{a}$	$\mathbf{c}$	$\mathbf{b}$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$pb2_1a\ (\mathbf{a}'/4)$	L33
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$pb11$	L12
(110)	$(-\mathbf{a}+\mathbf{b})$	$\mathbf{c}$	$(\mathbf{a}+\mathbf{b})$	$F222$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$c222\ (\mathbf{b}'/4)$	L22
(1$\overline{1}$0)	$(\mathbf{a}+\mathbf{b})$	$\mathbf{c}$	$(\mathbf{a}-\mathbf{b})$	$(\mathbf{b}'/4)$	$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$c222\ (\mathbf{a}'/4)$	L22
					$[\pm s\mathbf{d}, (\pm s + \frac{1}{2})\mathbf{d}]$	$\widehat{p}112\ (\mathbf{b}'/4)$	L03

Arithmetic class $4/mmmP$ (*cont.*)

Serial No.	135	136	137		138	
Group type	D_{4h}^{13}	D_{4h}^{14}	D_{4h}^{15}		D_{4h}^{16}	
Group	$P4_2/mbc$	$P4_2/mnm$	$P4_2/nmc$		$P4_2/ncm$	
			Origin 1	Origin 2	Origin 1	Origin 2
$(mn0)$	$P112/m$	$P112/m$	$P112/n$	$P112/n$	$P112/n$	$P112/n$
$(\bar{n}m0)$					$(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	
$(\bar{m}n0)$						
$(nm0)$						
$(0mn)$	$P112_1/a$	$P112_1/n$	$P112_1/m$	$P112_1/m$	$P112_1/b$	$P112_1/b$
$(0\bar{m}n)$			$(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$		$(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	
$(m0n)$	$P112_1/b$				$P112_1/a$	$P112_1/a$
$(m0\bar{n})$					$(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	
(hhl)	$B112/b$	$B112/m$	$B112/b$	$B112/b$	$B112/m$	$B112/m$
$(\bar{h}hl)$	$(\mathbf{a}/2$ or $\mathbf{b}/2)$		$(\mathbf{a}-\mathbf{b}+\mathbf{c})/4$		$(\mathbf{a}-\mathbf{b}+\mathbf{c})/4$	
$(h\bar{h}l)$			$B112/b$	$B112/b$	$B112/m$	$B112/m$
$(\bar{h}hl)$			$(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$(\mathbf{a}/2$ or $\mathbf{b}/2)$	$(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$(\mathbf{a}/2$ or $\mathbf{b}/2)$

Centring type *I*

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

Arithmetic classes $422I$ and $4mmI$

Serial No.	97	98	107	108	109	110
Group type	D_4^9	D_4^{10}	C_{4v}^9	C_{4v}^{10}	C_{4v}^{11}	C_{4v}^{12}
Group	$I422$	$I4_122$	$I4mm$	$I4cm$	$I4_1md$	$I4_1cd$
$(mn0)$	$I112$	$I112$	$I112$	$I112$	$I112$	$I112$
$(\bar{n}m0)$						
$(\bar{m}n0)$						
$(nm0)$						
$(0mn)$	$I112$	$I112$	$I11m$	$I11b$	$I11m$	$I11b$
$(0\bar{m}n)$		$(\mathbf{b}/4+\mathbf{c}/8)$				
$(m0n)$		$I112$		$I11a$		$I11a$
$(m0\bar{n})$		$(\mathbf{a}/4+3\mathbf{c}/8)$				
(hhl)	$A112$	$A112$	$A11m$	$A11m$	$A11n$	$A11n$
$(\bar{h}hl)$				$(\mathbf{a}/2$ or $\mathbf{b}/2)$	$(\mathbf{a}-\mathbf{b})/8$	$3(\mathbf{a}-\mathbf{b})/8$
$(h\bar{h}l)$					$A11n$	$A11n$
$(\bar{h}hl)$					$3(\mathbf{a}+\mathbf{b})/8$	$(\mathbf{a}+\mathbf{b})/8$

Arithmetic classes $\overline{4}m2I$ and $\overline{4}2mI$

Serial No.	119	120	121	122
Group type	D_{2d}^9	D_{2d}^{10}	D_{2d}^{11}	D_{2d}^{12}
Group	$I\overline{4}m2$	$I\overline{4}c2$	$I\overline{4}2m$	$I\overline{4}2d$
$(mn0)$	$I112$	$I112$	$I112$	$I112$
$(\overline{n}m0)$				
$(\overline{m}n0)$				
$(nm0)$				
$(0mn)$	$I11m$	$I11b$	$I112$	$I112$
$(0\overline{m}n)$				$(\mathbf{b}/4 + \mathbf{c}/8)$
$(m0n)$		$I11a$		$I112$
$(m0\overline{n})$				$(\mathbf{a}/4 + 3\mathbf{c}/8)$
(hhl)	$A112$	$A112$	$A11m$	$A11n$
$(\overline{h}\overline{h}l)$		$(\mathbf{c}/4)$		$(\mathbf{a} - \mathbf{b})/8$
$(h\overline{h}l)$				$A11n$
$(\overline{h}hl)$				$3(\mathbf{a} + \mathbf{b})/8$

Arithmetic class $4/mmmI$

Serial No.	139	140	141		142	
Group type	D_{4h}^{17}	D_{4h}^{18}	D_{4h}^{19}		D_{4h}^{20}	
Group	$I4/mmm$	$I4/mcm$	$I4_1/amd$		$I4_1acd$	
			Origin 1	Origin 2	Origin 1	Origin 2
$(mn0)$	$A112/a$	$A112/a$	$I112/b$	$I112/b$	$I112/b$	$I112/b$
$(\overline{n}m0)$			$(\mathbf{b} + \mathbf{c})/8$		$(\mathbf{b} + \mathbf{c})/8$	
$(\overline{m}n0)$						
$(nm0)$						
$(0mn)$	$I112/m$	$I112/b$	$I112/m$	$I112/m$	$I112/b$	$I112/b$
$(0\overline{m}n)$			$(\mathbf{b}/4 + \mathbf{c}/8)$		$(\mathbf{b}/4 + \mathbf{c}/8)$	
$(m0n)$		$I112/a$	$I112/m$	$I112/m$	$I112/a$	$I112/a$
$(m0\overline{n})$			$(\mathbf{a}/4 + 3\mathbf{c}/8)$	$(\mathbf{a} + \mathbf{b} + \mathbf{c})/4$	$(\mathbf{a}/4 + 3\mathbf{c}/8)$	$(\mathbf{a} + \mathbf{b} + \mathbf{c})/4$
(hhl)	$A112/m$	$A112/m$	$A112/a$	$A112/a$	$A112/a$	$A112/a$
$(\overline{h}\overline{h}l)$			$3(\mathbf{a}/4 + \mathbf{c}/8)$	$(\mathbf{a} - \mathbf{b} + \mathbf{c})/4$	$(\mathbf{a}/4 + 3\mathbf{c}/8)$	
$(h\overline{h}l)$			$A112/a$	$A112/a$	$A112/a$	
$(\overline{h}hl)$			$(\mathbf{a}/4 + \mathbf{c}/8)$	$(\mathbf{a}/2 \text{ or } \mathbf{b}/2)$	$3(\mathbf{a}/4 + \mathbf{c}/8)$	