Orthorhombic   6. SCANNING TABLES   Laue class $D_{2h} - mmm$

No. 65   *Cmmm* D_{2h}^{19}

$$\mathcal{G} = C\frac{2}{m}\frac{2}{m}\frac{2}{m}$$

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)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	*Cmmm*	$0\mathbf{d},\ \frac{1}{2}\mathbf{d}$	*cmmm*	L47
					$[s\mathbf{d}, -s\mathbf{d}]$	*cmm2*	L26
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$	*Bmmm*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	*pmmm*	L37
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*pmma* $(\mathbf{a}'/4)$	L41
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	*pmm2*	L23
(010)	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$	*Ammm*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	*pmmm*	L37
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*pmmb* $(\mathbf{b}'/4)$	L41
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	*pmm2*	L23

No. 66   *Cccm* D_{2h}^{20}

$$\mathcal{G} = C\frac{2}{c}\frac{2}{c}\frac{2}{m}$$

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)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	*Cccm*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	$\widehat{p}112/m$	L06
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*c222*	L22
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	$\widehat{p}112$	L03
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$	*Bbmb*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	*pbmb*	L38
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*pbmn* $(\mathbf{a}'/4)$	L42
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	*pbm2* $(\mathbf{b}'/4)$	L24
(010)	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$	*Amaa*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	*pmaa*	L38
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*pman* $(\mathbf{b}'/4)$	L42
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	*pma2* $(\mathbf{a}'/4)$	L24

No. 67*   *Cmme* D_{2h}^{21}

$$\mathcal{G} = C\frac{2}{m}\frac{2}{m}\frac{2}{a}$$

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)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	*Cmma*	$0\mathbf{d},\ \frac{1}{2}\mathbf{d}$	*cmme*	L48
					$[s\mathbf{d}, -s\mathbf{d}]$	*cmm2* $(\mathbf{b}/4)$	L26
(100)	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$	*Bmcm*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	*pmam*	L40
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*pmaa* $(\mathbf{a}'/4)$	L38
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	*pma2*	L24
(010)	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$	*Abmm*	$[0\mathbf{d},\ \frac{1}{2}\mathbf{d}]$	*pbmb*	L38
					$[\frac{1}{4}\mathbf{d},\ \frac{3}{4}\mathbf{d}]$	*pbmm* $(\mathbf{b}'/4)$	L40
					$[\pm s\mathbf{d},\ (\pm s + \frac{1}{2})\mathbf{d}]$	*pbm2* $(\mathbf{b}'/4)$	L24

*New symbol. Old symbol: *Cmma*.

Arithmetic class $mmmP$

Serial No.	47	48		49	50	
Group type	D_{2h}^1	D_{2h}^2		D_{2h}^3	D_{2h}^4	
Group	$Pmmm$	$Pnnn$		$Pccm$	$Pban$	
		Origin 1	Origin 2		Origin 1	Origin 2
$(mn0)$ $(\overline{m}n0)$	$P112/m$	$P112/n$ $[(\mathbf{a}+\mathbf{b}+\mathbf{c})/4]$	$P112/n$	$P112/m$	$P112/n$ $[(\mathbf{a}+\mathbf{b})/4]$	$P112/n$
$(0mn)$ $(0\overline{m}n)$				$P112/b$	$P112/a$ $[(\mathbf{a}+\mathbf{b})/4]$	$P112/a$
$(n0m)$ $(n0\overline{m})$				$P112/a$	$P112/b$ $[(\mathbf{a}+\mathbf{b})/4]$	$P112/b$

Serial No.	51	52	53	54	55	56
Group type	D_{2h}^5	D_{2h}^6	D_{2h}^7	D_{2h}^8	D_{2h}^9	D_{2h}^{10}
Group	$Pmma$	$Pnna$	$Pmna$	$Pcca$	$Pbam$	$Pccn$
$(mn0)$ $(\overline{m}n0)$	$P112/a$	$P112/a$	$P112_1/a$	$P112/a$	$P112/m$	$P112/n$
$(0mn)$ $(0\overline{m}n)$	$P112_1/m$	$P112/n$	$P112/m$	$P112_1/b$	$P112_1/a$	$P112_1/b$
$(n0m)$ $(n0\overline{m})$	$P112/m$	$P112_1/n$	$P112/n$	$P112/a$	$P112_1/b$	$P112_1/a$

Serial No.	57	58	59		60	61	62
Group type	D_{2h}^{11}	D_{2h}^{12}	D_{2h}^{13}		D_{2h}^{14}	D_{2h}^{15}	D_{2h}^{16}
Group	$Pbcm$	$Pnnm$	$Pmmn$		$Pbcn$	$Pbca$	$Pnma$
			Origin 1	Origin 2			
$(mn0)$ $(\overline{m}n0)$	$P112_1/m$	$P112/m$	$P112/n$ $[(\mathbf{a}+\mathbf{b})/4]$	$P112/n$	$P112_1/n$	$P112_1/a$	$P112_1/a$
$(0mn)$ $(0\overline{m}n)$	$P112/a$	$P112_1/n$	$P112_1/m$ $[(\mathbf{a}+\mathbf{b})/4]$	$P112_1/m$	$P112_1/a$		$P112_1/n$
$(n0m)$ $(n0\overline{m})$	$P112_1/a$				$P112/a$		$P112_1/m$

Centring type C

Orientation orbit (hkl)	Conventional basis of the scanning group $\mathbf{a}'$ $\mathbf{b}'$ $\mathbf{d}$			Auxiliary basis of the scanning group $\widehat{\mathbf{a}}$ $\widehat{\mathbf{b}}$ $\widehat{\mathbf{c}}$		
$(hk0)$ $(\overline{h}k0)$	$\mathbf{c}$ $\mathbf{c}$	$n\widehat{\mathbf{a}} - m\widehat{\mathbf{b}}$ $n\widehat{\mathbf{a}} + m\widehat{\mathbf{b}}$	$p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$ $-p\widehat{\mathbf{a}} + q\widehat{\mathbf{b}}$	$(\mathbf{a}-\mathbf{b})/2$	$(\mathbf{a}+\mathbf{b})/2$	$\mathbf{c}$
h even, k odd or h odd, k even $\Rightarrow n = h+k, m = h-k$ h, k odd $\Rightarrow n = (h+k)/2, m = (h-k)/2$						
$(0mn)$ $(0\overline{m}n)$	$\mathbf{a}$ $\mathbf{a}$	$n\mathbf{b} - m\mathbf{c}$ $n\mathbf{b} + m\mathbf{c}$	$p\mathbf{b} + q\mathbf{c}$ $-p\mathbf{b} + q\mathbf{c}$	$\mathbf{b}$	$\mathbf{c}$	$\mathbf{a}$
$(n0m)$ $(n0\overline{m})$	$\mathbf{b}$ $\mathbf{b}$	$n\mathbf{c} - m\mathbf{a}$ $n\mathbf{c} + m\mathbf{a}$	$p\mathbf{c} + q\mathbf{a}$ $-p\mathbf{c} + q\mathbf{a}$	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$

Arithmetic classes 222C and $mm2C$

Serial No.	20	21	35	36	37
Group type	D_2^5	D_2^6	C_{2v}^{11}	C_{2v}^{12}	C_{2v}^{13}
Group	$C222_1$	$C222$	$Cmm2$	$Cmc2_1$	$Ccc2$
$(hk0)$ $(\overline{h}k0)$	$P112_1$	$P112$	$P112$	$P112_1$	$P112$
$(0mn)$ $(0\overline{m}n)$	$B112$	$B112$	$B11m$	$B11m$	$B11b$
$(n0m)$ $(n0\overline{m})$	$A112$ $(\mathbf{c}/4)$	$A112$	$A11m$	$A11a$	$A11a$

Arithmetic class $mmmC$

Serial No.	63	64	65	66	67	68	
Group type	D_{2h}^{17}	D_{2h}^{18}	D_{2h}^{19}	D_{2h}^{20}	D_{2h}^{21}	D_{2h}^{22}	
Group	$Cmcm$	$Cmce$	$Cmmm$	$Cccm$	$Cmme$	$Ccce$	
						Origin 1	Origin 2
$(hk0)$ $(\overline{h}k0)$	$P112_1/m$	$P112_1/n$	$P112/m$	$P112/m$	$P112/n$	$P112/n$ $[(\mathbf{b}+\mathbf{c})/4]$	$P112/n$
$(0mn)$ $(0\overline{m}n)$	$B112/m$	$B112/m$	$B112/m$	$B112/b$	$B112/m$	$B112/n$ $[(\mathbf{a}+\mathbf{c})/4]$	$B112/n$
$(n0m)$ $(n0\overline{m})$	$A112/a$	$A112/n$	$A112/m$	$A112/a$	$A112/m$ $[(\mathbf{a}+\mathbf{b})/4]$	$A112/a$ $[(\mathbf{b}+\mathbf{c})/4]$	$A112/a$

Centring type A

Orientation orbit (hkl)	Conventional basis of the scanning group			Auxiliary basis of the scanning group		
	$\mathbf{a}'$ $\mathbf{b}'$		$\mathbf{d}$	$\widehat{\mathbf{a}}$	$\widehat{\mathbf{b}}$	$\widehat{\mathbf{c}}$
$(mn0)$ $(\overline{m}n0)$	$\mathbf{c}$ $\mathbf{c}$	$n\mathbf{a}-m\mathbf{b}$ $n\mathbf{a}+m\mathbf{b}$	$p\mathbf{a}+q\mathbf{b}$ $-p\mathbf{a}+q\mathbf{b}$	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$
$(0kl)$ $(\overline{k}l0)$	$\mathbf{a}$ $\mathbf{a}$	$n\widehat{\mathbf{a}}-m\widehat{\mathbf{b}}$ $n\widehat{\mathbf{a}}+m\widehat{\mathbf{b}}$	$p\widehat{\mathbf{a}}+q\widehat{\mathbf{b}}$ $-p\widehat{\mathbf{a}}+q\widehat{\mathbf{b}}$	$(\mathbf{b}-\mathbf{c})/2$	$(\mathbf{b}+\mathbf{c})/2$	$\mathbf{a}$
	k even, l odd or k odd, l even $\Rightarrow n = k+l, m = k-l$ k, l odd $\Rightarrow n = (k+l)/2, m = (k-l)/2$					
$(n0m)$ $(n0\overline{m})$	$\mathbf{b}$ $\mathbf{b}$	$n\mathbf{c}-m\mathbf{a}$ $n\mathbf{c}+m\mathbf{a}$	$p\mathbf{c}+q\mathbf{a}$ $-p\mathbf{c}+q\mathbf{a}$	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{b}$

Arithmetic class $mm2A$

Serial No.	38	39	40	41
Group type	C_{2v}^{14}	C_{2v}^{15}	C_{2v}^{16}	C_{2v}^{17}
Group	$Amm2$	$Aem2$	$Ama2$	$Aea2$
$(mn0)$ $(\overline{m}n0)$	$A112$	$A112$	$A112$	$A112$
$(0kl)$ $(0\overline{k}l)$	$P11m$	$P11n$	$P11m$ $(\mathbf{a}/4)$	$P11n$ $(\mathbf{a}/4)$
$(n0m)$ $(n0\overline{m})$	$B11m$	$B11m$ $(\mathbf{b}/4)$	$B11b$	$B11b$ $(\mathbf{b}/4)$