International Tables for Crystallography (2006). Vol. E, Scanning table for space group 141, pp. 495–496.

No. 140 $I4/mcm$ D_{4h}^{18}

$$\mathcal{G} = I\frac{4}{m}\frac{2}{c}\frac{2}{m}$$

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)	**a**	**b**	**c**	$I4/mcm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p4/mbm$	L63
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p4/nbm$	L62
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p4bm$	L56
(100)	**b**	**c**	**a**	$Icma$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pbmb$	L38
(010)	$-\mathbf{a}$	**c**	**b**		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$pbma$ $[(\mathbf{a}'+\mathbf{b}')/4]$	L45
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$pbm2$ $(\mathbf{b}'/4)$	L24
(110)	$(-\mathbf{a}+\mathbf{b})$	**c**	$(\mathbf{a}+\mathbf{b})$	$Fmmm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$cmme$ $[(\mathbf{a}'+\mathbf{b}')/4]$	L48
$(1\bar{1}0)$	$(\mathbf{a}+\mathbf{b})$	**c**	$(\mathbf{a}-\mathbf{b})$	$[(\mathbf{a}'+\mathbf{d})/4]$	$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$cmmm$ $(\mathbf{a}'/4)$	L47
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$cmm2$ $(\mathbf{a}'/4)$	L26

No. 141 $I4_1/amd$ D_{4h}^{19}

$$\mathcal{G} = I\frac{4_1}{a}\frac{2}{m}\frac{2}{d} \quad \text{origin 1}$$

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)	**a**	**b**	**c**	$I4_1/amd$ (origin 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	$p\bar{4}m2$	L59
					$\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p\bar{4}m2$ $(\mathbf{a}/2$ or $\mathbf{b}/2)$	L59
					$[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$	$pmmb$ $(\mathbf{b}/4)$	L41
					$\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$	$pmma$ $(\mathbf{a}/4)$	L41
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{4})\mathbf{d},$		
					$(\pm s+\frac{1}{2})\mathbf{d}, (\pm s+\frac{3}{4})\mathbf{d}]$	$pmm2$	L23
(100)	**b**	**c**	**a**	$Imcm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pmam$ $(\mathbf{a}'/4+\mathbf{b}'/8)$	L40
				$(\mathbf{a}'/4+\mathbf{b}'/8)$	$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$pman$ $(\mathbf{b}'/8)$	L42
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$pma2$ $(\mathbf{a}'/4+\mathbf{b}'/8)$	L24
(010)	$-\mathbf{a}$	**c**	**b**	$Imcm$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$pmam$ $(\mathbf{a}'/4+3\mathbf{b}'/8)$	L40
				$(\mathbf{a}'/4+3\mathbf{b}'/8)$	$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$pman$ $(\mathbf{b}'/8)$	L42
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$pma2$ $(\mathbf{a}'/4+3\mathbf{b}'/8)$	L24
(110)	$(-\mathbf{a}+\mathbf{b})$	**c**	$(\mathbf{a}+\mathbf{b})$	$Fddd$ (or. 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	$c222$	L22
					$\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$c222$ $[(\mathbf{a}'+\mathbf{b}')/4]$	L22
				or	$[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$	$\widehat{p}112/b$ $[(\mathbf{a}'+\mathbf{b}')/8]$	L16
				$Fddd$ (or. 2)	$\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$	$\widehat{p}112/a$ $[(3\mathbf{a}'+\mathbf{b}')/8$	
				$[(\mathbf{a}'+\mathbf{b}'+\mathbf{d})/8]$		or $(\mathbf{a}'+3\mathbf{b}')/8]$	L16
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{4})\mathbf{d};$		
					$(\pm s+\frac{1}{2})\mathbf{d}, (\pm s+\frac{3}{4})\mathbf{d}]$	$\widehat{p}112$	L03
$(1\bar{1}0)$	$(\mathbf{a}+\mathbf{b})$	**c**	$(\mathbf{a}-\mathbf{b})$	$Fddd$ (or. 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	$c222$	L22
				$[(\mathbf{a}'+\mathbf{b}'+\mathbf{d})/4]$	$\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$c222$ $[(\mathbf{a}'+\mathbf{b}')/4]$	L22
				or	$[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$	$\widehat{p}112/a$ $[(3\mathbf{a}'+\mathbf{b}')/8$	
				$Fddd$ (or. 2)		or $(\mathbf{a}'+3\mathbf{b}')/8]$	L16
				$[3(\mathbf{a}'+\mathbf{b}'+\mathbf{d})/8]$	$\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$	$\widehat{p}112/b$ $[(\mathbf{a}'+\mathbf{b}')/8]$	L16
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{4})\mathbf{d};$		
					$(\pm s+\frac{1}{2})\mathbf{d}, (\pm s+\frac{3}{4})\mathbf{d}]$	$\widehat{p}112$	L03

No. 141 $I4_1/amd$ D_{4h}^{19}

$\mathcal{G} = I\frac{4_1}{a}\frac{2}{m}\frac{2}{d}$ 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)	**a**	**b**	**c**	$I4_1/amd$ (origin 2)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	*pmmb*	L41
					$\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	*pmma* $[(\mathbf{a}+\mathbf{b})/4]$	L41
					$[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$	$p\bar{4}m2$ $(3\mathbf{b}/4)$	L59
					$\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$	$p\bar{4}m2$ $(\mathbf{b}/4)$	L59
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{4})\mathbf{d},$		
					$(\pm s+\frac{1}{2})\mathbf{d}, (\pm s+\frac{3}{4})\mathbf{d}]$	*pmm2* $(\mathbf{b}/4)$	L23
(100)	**b**	**c**	**a**	*Imcm*	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	*pmam*	L40
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	*pman* $[(\mathbf{a}'+\mathbf{b}')/4]$	L42
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	*pma2*	L24
(010)	$-\mathbf{a}$	**c**	**b**	*Imcm*	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	*pman*	L42
				$[(\mathbf{a}'+\mathbf{b}'+\mathbf{d})/4]$	$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	*pman* $[(\mathbf{a}'+\mathbf{b}')/4]$	L40
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	*pma2* $[(\mathbf{a}'+\mathbf{b}')/4]$	L24
(110)	$(-\mathbf{a}+\mathbf{b})$	**c**	$(\mathbf{a}+\mathbf{b})$	*Fddd* (or. 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	$\widehat{p}112/a$	L16
				$[(\mathbf{a}'+3\mathbf{b}'+\mathbf{d})/8]$	$\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$\widehat{p}112/b$ $(\mathbf{a}'/4$ or $\mathbf{b}'/4)$	L16
				or	$[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$	$c222$ $[(\mathbf{a}'+3\mathbf{b}')/8]$	L22
				Fddd (or. 2)	$\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$	$c222$ $[(3\mathbf{a}'+\mathbf{b}')/8]$	L22
				$[(\mathbf{a}'+\mathbf{d})/4]$	$[\pm s\mathbf{d}, (\pm s+\frac{1}{4})\mathbf{d};$	$\widehat{p}112$ $[(\mathbf{a}'+3\mathbf{b}')/8$	
					$(\pm s+\frac{1}{2})\mathbf{d}, (\pm s+\frac{3}{4})\mathbf{d}]$	or $(3\mathbf{a}'+\mathbf{b}')/8]$	L03
$(1\bar{1}0)$	$(\mathbf{a}+\mathbf{b})$	**c**	$(\mathbf{a}-\mathbf{b})$	*Fddd* (or. 1)	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	$\widehat{p}112/a$	L16
				$[(3\mathbf{a}'+\mathbf{b}'+\mathbf{d})/8]$	$\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$\widehat{p}112/b$ $(\mathbf{a}'/4$ or $\mathbf{b}'/4)$	L16
				or	$[\frac{1}{8}\mathbf{d}, \frac{5}{8}\mathbf{d};$	$c222$ $[(3\mathbf{a}'+\mathbf{b}')/8]$	L22
				Fddd (or. 2)	$\frac{3}{8}\mathbf{d}, \frac{7}{8}\mathbf{d}]$	$c222$ $[(\mathbf{a}'+3\mathbf{b}')/8]$	L22
				$[(\mathbf{b}'+\mathbf{d})/4]$	$[\pm s\mathbf{d}, (\pm s+\frac{1}{4})\mathbf{d};$	$\widehat{p}112$ $[(\mathbf{a}'+3\mathbf{b}')/4$	
					$(\pm s+\frac{1}{2})\mathbf{d}, (\pm s+\frac{3}{4})\mathbf{d}]$	or $(3\mathbf{a}'+\mathbf{b}')/8]$	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
$(mn0)$ $(\overline{n}m0)$ $(\overline{m}n0)$ $(nm0)$	$P112/m$	$P112/m$	$P112/n$	$P112/n$	$P112/n$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$P112/n$
$(0mn)$ $(0\overline{m}n)$	$P112_1/a$	$P112_1/n$	$P112_1/m$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$P112_1/m$	$P112_1/b$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$P112_1/b$
$(m0n)$ $(m0\overline{n})$	$P112_1/b$				$P112_1/a$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$P112_1/a$
(hhl) $(\overline{h}hl)$	$B112/b$ ($\mathbf{a}/2$ or $\mathbf{b}/2$)	$B112/m$	$B112/b$ $(\mathbf{a}-\mathbf{b}+\mathbf{c})/4$	$B112/b$	$B112/m$ $(\mathbf{a}-\mathbf{b}+\mathbf{c})/4$	$B112/m$
$(h\overline{h}l)$ $(\overline{h}hl)$			$B112/b$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$B112/b$ ($\mathbf{a}/2$ or $\mathbf{b}/2$)	$B112/m$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$B112/m$ ($\mathbf{a}/2$ or $\mathbf{b}/2$)

Centring type *I*

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)	$\mathbf{a}-\mathbf{b}$	$n\widehat{\mathbf{a}}-m\mathbf{c}$	$p\widehat{\mathbf{a}}+q\mathbf{c}$	$(\mathbf{a}+\mathbf{b}+\mathbf{c})/2$	$\mathbf{c}$	$\mathbf{a}-\mathbf{b}$
$(\overline{h}hl)$	$\mathbf{a}-\mathbf{b}$	$n\widehat{\mathbf{a}}+m\mathbf{c}$	$-p\widehat{\mathbf{a}}+q\mathbf{c}$			
$(h\overline{h}l)$	$\mathbf{a}+\mathbf{b}$	$n\widehat{\mathbf{a}}-m\mathbf{c}$	$p\widehat{\mathbf{a}}+q\mathbf{c}$	$(\mathbf{b}-\mathbf{a}+\mathbf{c})/2$	$\mathbf{c}$	$\mathbf{a}+\mathbf{b}$
$(\overline{h}hl)$	$\mathbf{a}+\mathbf{b}$	$n\widehat{\mathbf{a}}+m\mathbf{c}$	$-p\widehat{\mathbf{a}}+q\mathbf{c}$			
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	$I422$	$I4_122$	$I4mm$	$I4cm$	$I4_1md$	$I4_1cd$
$(mn0)$ $(\overline{n}m0)$ $(\overline{m}n0)$ $(nm0)$	$I112$	$I112$	$I112$	$I112$	$I112$	$I112$
$(0mn)$ $(0\overline{m}n)$	$I112$	$I112$ $(\mathbf{b}/4+\mathbf{c}/8)$	$I11m$	$I11b$	$I11m$	$I11b$
$(m0n)$ $(m0\overline{n})$		$I112$ $(\mathbf{a}/4+3\mathbf{c}/8)$		$I11a$		$I11a$
(hhl) $(\overline{h}hl)$	$A112$	$A112$	$A11m$	$A11m$ ($\mathbf{a}/2$ or $\mathbf{b}/2$)	$A11n$ $(\mathbf{a}-\mathbf{b})/8$	$A11n$ $3(\mathbf{a}-\mathbf{b})/8$
$(h\overline{h}l)$ $(\overline{h}hl)$					$A11n$ $3(\mathbf{a}+\mathbf{b})/8$	$A11n$ $(\mathbf{a}+\mathbf{b})/8$

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	$I\overline{4}m2$	$I\overline{4}c2$	$I\overline{4}2m$	$I\overline{4}2d$
$(mn0)$ $(\overline{n}m0)$ $(\overline{m}n0)$ $(nm0)$	$I112$	$I112$	$I112$	$I112$
$(0mn)$ $(0\overline{m}n)$	$I11m$	$I11b$	$I112$	$I112$ $(\mathbf{b}/4+\mathbf{c}/8)$
$(m0n)$ $(m0\overline{n})$		$I11a$		$I112$ $(\mathbf{a}/4+3\mathbf{c}/8)$
(hhl) $(\overline{h}hl)$ $(h\overline{h}l)$ $(\overline{h}\overline{h}l)$	$A112$	$A112$ $(\mathbf{c}/4)$	$A11m$	$A11n$ $(\mathbf{a}-\mathbf{b})/8$ $A11n$ $3(\mathbf{a}+\mathbf{b})/8$

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
$(mn0)$ $(\overline{n}m0)$ $(\overline{m}n0)$ $(nm0)$	$A112/a$	$A112/a$	$I112/b$ $(\mathbf{b}+\mathbf{c})/8$	$I112/b$	$I112/b$ $(\mathbf{b}+\mathbf{c})/8$	$I112/b$
$(0mn)$ $(0\overline{m}n)$	$I112/m$	$I112/b$	$I112/m$ $(\mathbf{b}/4+\mathbf{c}/8)$	$I112/m$	$I112/b$ $(\mathbf{b}/4+\mathbf{c}/8)$	$I112/b$
$(m0n)$ $(m0\overline{n})$		$I112/a$	$I112/m$ $(\mathbf{a}/4+3\mathbf{c}/8)$	$I112/m$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$	$I112/a$ $(\mathbf{a}/4+3\mathbf{c}/8)$	$I112/a$ $(\mathbf{a}+\mathbf{b}+\mathbf{c})/4$
(hhl) $(\overline{h}hl)$ $(h\overline{h}l)$ $(\overline{h}\overline{h}l)$	$A112/m$	$A112/m$	$A112/a$ $3(\mathbf{a}/4+\mathbf{c}/8)$ $A112/a$ $(\mathbf{a}/4+\mathbf{c}/8)$	$A112/a$ $(\mathbf{a}-\mathbf{b}+\mathbf{c})/4$ $A112/a$ ($\mathbf{a}/2$ or $\mathbf{b}/2$)	$A112/a$ $(\mathbf{a}/4+3\mathbf{c}/8)$ $A112/a$ $3(\mathbf{a}/4+\mathbf{c}/8)$	$A112/a$