No. 150 $P321$ D_3^2

$$\mathcal{G} = P321$$

Orientation orbit $(hkil)$	Conventional basis of the scanning group $\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	Scanning group $\mathcal{H}$	Linear orbit $s\mathbf{d}$	Sectional layer group $\mathcal{L}(s\mathbf{d})$	
(0001)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	$P321$	$0\mathbf{d}$, $\frac{1}{2}\mathbf{d}$	$p321$	L68
					$[s\mathbf{d}, -s\mathbf{d}]$	$p3$	L65
$(01\overline{1}0)$	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{a}+2\mathbf{b}$	$A121$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p121$	L08
$(\overline{1}010)$	$\mathbf{c}$	$\mathbf{b}$	$-(2\mathbf{a}+\mathbf{b})$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p12_11$	L09
$(1\overline{1}00)$	$\mathbf{c}$	$-(\mathbf{a}+\mathbf{b})$	$(\mathbf{a}-\mathbf{b})$		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p1$	L01
$(\overline{1}2\overline{1}0)$	$\mathbf{c}$	$2\mathbf{a}+\mathbf{b}$	$\mathbf{b}$	$A112$	$[s\mathbf{d}, (s+\frac{1}{2})\mathbf{d}]$	$p112$	L03
$(\overline{1}\overline{1}20)$	$\mathbf{c}$	$(\mathbf{b}-\mathbf{a})$	$-(\mathbf{a}+\mathbf{b})$				
$(2\overline{1}\overline{1}0)$	$\mathbf{c}$	$-(\mathbf{a}+2\mathbf{b})$	$\mathbf{a}$				

No. 151 $P3_112$ D_3^3

$$\mathcal{G} = P3_112$$

Orientation orbit $(hkil)$	Conventional basis of the scanning group $\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	Scanning group $\mathcal{H}$	Linear orbit $s\mathbf{d}$	Sectional layer group $\mathcal{L}(s\mathbf{d})$	
(0001)	$\mathbf{a}$	$\mathbf{b}$	$\mathbf{c}$	$P3_112$	$[0\mathbf{d},\ [\frac{1}{2}\mathbf{d},$	$\widehat{c}_2121$	L10
					$\frac{1}{3}\mathbf{d},\ \|\ \frac{5}{6}\mathbf{d},$	$\widehat{c}_3121$	L10
					$\frac{2}{3}\mathbf{d}]\quad \frac{1}{6}\mathbf{d}]$	$\widehat{c}_1121$	L10
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{3})\mathbf{d},$		
					$(\pm s+\frac{2}{3})\mathbf{d}]$	$p1$	L01
$(01\overline{1}0)$	$\mathbf{c}$	$\mathbf{a}$	$\mathbf{a}+2\mathbf{b}$	$A112\ (\mathbf{a}'/6)$	$[s\mathbf{d}, (s+\frac{1}{2})\mathbf{d}]$	$p112\ (\mathbf{a}'/6)$	L03
$(\overline{1}010)$	$\mathbf{c}$	$\mathbf{b}$	$-(2\mathbf{a}+\mathbf{b})$	$A112$	$[s\mathbf{d}, (s+\frac{1}{2})\mathbf{d}]$	$p112$	L03
$(1\overline{1}00)$	$\mathbf{c}$	$-(\mathbf{a}+\mathbf{b})$	$(\mathbf{a}-\mathbf{b})$	$A112\ (\mathbf{a}'/3)$	$[s\mathbf{d}, (s+\frac{1}{2})\mathbf{d}]$	$p112\ (\mathbf{a}'/3)$	L03
$(\overline{1}2\overline{1}0)$	$\mathbf{c}$	$2\mathbf{a}+\mathbf{b}$	$\mathbf{b}$	$A121$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p121$	L08
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p12_11$	L09
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p1$	L01
$(\overline{1}\overline{1}20)$	$\mathbf{c}$	$(\mathbf{b}-\mathbf{a})$	$-(\mathbf{a}+\mathbf{b})$	$A121\ (\mathbf{a}'/3)$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p121\ (\mathbf{a}'/3)$	L08
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p12_11\ (\mathbf{a}'/3)$	L09
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p1$	L01
$(2\overline{1}\overline{1}0)$	$\mathbf{c}$	$-(\mathbf{a}+2\mathbf{b})$	$\mathbf{a}$	$A121\ (\mathbf{a}'/6)$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p121\ (\mathbf{a}'/6)$	L08
					$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p12_11\ (\mathbf{a}'/6)$	L09
					$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p1$	L01

No. 167 $R\overline{3}c$ D^6_{3d}

$$\mathcal{G} = R\overline{3}\tfrac{2}{c}$$

Orientation orbit		Conventional basis of the scanning group			Scanning group	Linear orbit	Sectional layer group	
HEXAG. AXES $(hkil)$	RHOMB. AXES (hkl)	$\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	$\mathcal{H}$	$s\mathbf{d}$	$\mathcal{L}(s\mathbf{d})$	
(0001)	(111)	**a**	**b**	**c**	$R\overline{3}c$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d};$	$p\overline{3}$	L66
						$\frac{1}{3}\mathbf{d}, \frac{5}{6}\mathbf{d};$	$p\overline{3}\ [(2\mathbf{a}+\mathbf{b})/3]$	L66
						$\frac{2}{3}\mathbf{d}, \frac{1}{6}\mathbf{d}]$	$p\overline{3}\ [(\mathbf{a}+2\mathbf{b})/3]$	L66
						$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d};$	$p321$	L68
						$\frac{1}{12}\mathbf{d}, \frac{7}{12}\mathbf{d};$	$p321\ [(2\mathbf{a}+\mathbf{b})/3]$	L68
						$\frac{5}{12}\mathbf{d}, \frac{11}{12}\mathbf{d}]$	$p321\ [(\mathbf{a}+2\mathbf{b})/3]$	L68
						$[\pm s\mathbf{d}, (\pm s+\frac{1}{6})\mathbf{d},$		
						$(\pm s+\frac{1}{3})\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d},$		
						$(\pm s+\frac{2}{3})\mathbf{d}, (\pm s+\frac{5}{6})\mathbf{d}]$	$p3$	L65
$(01\overline{1}0)$	$(11\overline{1})$	**c**	**a**	$-\mathbf{c}_r$	$I12_1/a1$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p12/a1$	L16
$(\overline{1}010)$	$(\overline{1}11)$	**c**	**b**	$-\mathbf{a}_r$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p12_1/a1\ \ [(\mathbf{a}'+\mathbf{b}')/4]$	L17
$(1\overline{1}00)$	$(1\overline{1}1)$	**c**	$-(\mathbf{a}+\mathbf{b})$	$-\mathbf{b}_r$		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p1a1$	L12
$(\overline{1}2\overline{1}0)$	$(01\overline{1})$	**c**	$\mathbf{a}_r$	**b**	$I112/a$	$[0\mathbf{d}, \frac{1}{2}\mathbf{d}]$	$p112/a$	L07
$(\overline{1}\overline{1}20)$	$(\overline{1}01)$	**c**	$\mathbf{b}_r$	$-(\mathbf{a}+\mathbf{b})$		$[\frac{1}{4}\mathbf{d}, \frac{3}{4}\mathbf{d}]$	$p112/b\ [(\mathbf{a}'+\mathbf{b}')/4]$	L07
$(2\overline{1}\overline{1}0)$	$(1\overline{1}0)$	**c**	$\mathbf{c}_r$	**a**		$[\pm s\mathbf{d}, (\pm s+\frac{1}{2})\mathbf{d}]$	$p112\ (\mathbf{a}'/4)$	L03

Auxiliary tables for Laue class $D_{3d} - \overline{3}m$

Centring type *P*

Arithmetic classes $312P$, $31mP$ and $\overline{3}1mP$

Orientation orbit	Conventional basis of the scanning group			Auxiliary basis of the scanning group		
$(hkil)$	$\mathbf{a}'$	$\mathbf{b}'$	$\mathbf{d}$	$\widehat{\mathbf{a}}$	$\widehat{\mathbf{b}}$	$\widehat{\mathbf{c}}$
$(\overline{h}2h\overline{h}l)$	$2\mathbf{a}+\mathbf{b}$	$n\mathbf{b}-m\mathbf{c}$	$p\mathbf{b}+q\mathbf{c}$	**b**	**c**	$2\mathbf{a}+\mathbf{b}$
$(\overline{hh}2hl)$	$\mathbf{b}-\mathbf{a}$	$-n(\mathbf{a}+\mathbf{b})-m\mathbf{c}$	$-p(\mathbf{a}+\mathbf{b})+q\mathbf{c}$	$-(\mathbf{a}+\mathbf{b})$	**c**	$\mathbf{b}-\mathbf{a}$
$(2h\overline{hh}l)$	$-(\mathbf{a}+2\mathbf{b})$	$n\mathbf{a}-m\mathbf{c}$	$p\mathbf{a}+q\mathbf{c}$	**a**	**c**	$-\mathbf{a}+2\mathbf{b}$
l odd $\Rightarrow n=l, m=2h$; l even $\Rightarrow n=l/2, m=h$						

Arithmetic classes $312P$, $31mP$ and $\overline{3}1mP$

Serial No.	149	151	153	157	159	162	163
Group type	D^1_3	D^3_3	D^5_3	C^2_{3v}	C^4_{3v}	D^1_{3d}	D^2_{3d}
Group	$P312$	$P3_112$	$P3_212$	$P31m$	$P31c$	$P\overline{3}1m$	$P\overline{3}1c$
$(\overline{h}2h\overline{h}l)$	$B112$	$B112$	$B112$	$B11m$	$B11b$	$B112/m$	$B112/b$
$(\overline{hh}2hl)$		$B112\ (\mathbf{c}/3)$	$B112\ (\mathbf{c}/6)$				
$(2h\overline{hh}l)$		$B112\ (\mathbf{c}/6)$	$B112\ (\mathbf{c}/3)$				