

Pmma

No. 51

*P2₁/m2/m2/a**D_{2h}⁵*

Axes	Coordinates	Wyckoff positions									
		2a	2b	2c	2d	2e	2f	4g	4h	4i	4j
I Maximal translationengleiche subgroups											
[2] <i>Pm2a</i> (28) $\cong Pma2$	a, c, -b $x, z, -y$	2a	2a	2b	2b	2c	2c	$2\times 2a$	$2\times 2b$	4d	4d
[2] <i>P2₁ma</i> (26) $\cong Pmc2_1$	b, c, a y, z, x	2a	2b	2a	2b	2a	2b	4c	4c	$2\times 2a$	$2\times 2b$
[2] <i>Pmm2</i> (25)	$x+\frac{1}{4}, y, z$	2e	2f	2e	2f	1a; 1c	1b; 1d	4i	4i	$2\times 2e$	$2\times 2f$
										$2g; 2h$	$2\times 4i$
[2] <i>P2₁22</i> (17) $\cong P222_1$	b, c, a y, z, x	2a	2a	2b	2b	2c	2d	$2\times 2a$	$2\times 2b$	4e	4e
[2] <i>P112/a</i> (13) $\cong P12/c1$	b, c, a y, z, x	2a	2d	2c	2b	2e	2f	4g	4g	4g	4g
[2] <i>P2₁/m11</i> (11) $\cong P12_1/m1$	c, a, b z, x, y	2a	2c	2b	2d	2e	2e	4f	4f	4f	$2\times 4f$
[2] <i>P12/m1</i> (10)		1a; 1d	1b; 1e	1c; 1g	1f; 1h	2m	2n	2i; 2j	2k; 2l	$2\times 2m$	$2\times 2n$
										4o	$2\times 4o$

II Maximal klassengleiche subgroups

Enlarged unit cell, non-isomorphic see next page

Enlarged unit cell, isomorphic

[3] <i>Pmma</i>	3a, b, c $\frac{1}{3}x, y, z;$ $\pm(\frac{1}{3}, 0, 0)$	2a; 4i	2b; 4j	2c; 4i	2d; 4j	2e; 4i	2f; 4j	4g; 8l	4h; 8l	$3\times 4i$	$3\times 4j$
[p] <i>Pmma</i>	p_a, b, c $\frac{1}{p}x, y, z;$ $+(\frac{u}{p}, 0, 0)$	2a; $\frac{p-1}{2}\times 4i$	2b; $\frac{p-1}{2}\times 4j$	2c; $\frac{p-1}{2}\times 4i$	2d; $\frac{p-1}{2}\times 4j$	2e; $\frac{p-1}{2}\times 4i$	2f; $\frac{p-1}{2}\times 4j$	4g; $\frac{p-1}{2}\times 8l$	4h; $\frac{p-1}{2}\times 8l$	$p\times 4i$	$p\times 4j$
	$p = \text{prime} > 2; u = 1, \dots, p-1$									$4k; \frac{p-1}{2}\times 8l$	$p\times 8l$
[2] <i>Pmma</i>	a, 2b, c $x, \frac{1}{2}y, z;$ $+(0, \frac{1}{2}, 0)$	2a; 2b	4g	2c; 2d	4h	2e; 2f	4k	$2\times 4g$	$2\times 4h$	4i; 4j	8l
[2] <i>Pmma</i>	a, 2b, c $x, \frac{1}{2}y + \frac{1}{4}, z;$ $+(0, \frac{1}{2}, 0)$	4g	2a; 2b	4h	2c; 2d	4k	2e; 2f	$2\times 4g$	$2\times 4h$	8l	4i; 4j
[3] <i>Pmma</i>	a, 3b, c $x, \frac{1}{3}y, z;$ $\pm(0, \frac{1}{3}, 0)$	2a; 4g	2b; 4g	2c; 4h	2d; 4h	2e; 4k	2f; 4k	$3\times 4g$	$3\times 4h$	4i; 8l	$4j; 8l$
[p] <i>Pmma</i>	a, p_b, c $x, \frac{1}{p}y, z;$ $+(0, \frac{u}{p}, 0)$	2a; $\frac{p-1}{2}\times 4g$	2b; $\frac{p-1}{2}\times 4g$	2c; $\frac{p-1}{2}\times 4h$	2d; $\frac{p-1}{2}\times 4h$	2e; $\frac{p-1}{2}\times 4k$	2f; $\frac{p-1}{2}\times 4k$	$p\times 4g$	$p\times 4h$	4i; $\frac{p-1}{2}\times 8l$	$4j; \frac{p-1}{2}\times 8l$
	$p = \text{prime} > 2; u = 1, \dots, p-1$									$p\times 4k$	$p\times 8l$
[2] <i>Pmma</i>	a, b, 2c $x, y, \frac{1}{2}z;$ $+(0, 0, \frac{1}{2})$	2a; 2c	2b; 2d	4i	4j	$2\times 2e$	$2\times 2f$	4g; 4h	8l	$2\times 4i$	$2\times 4j$
[2] <i>Pmma</i>	a, b, 2c $x, y, \frac{1}{2}z + \frac{1}{4};$ $+(0, 0, \frac{1}{2})$	4i	4j	2a; 2c	2b; 2d	$2\times 2e$	$2\times 2f$	8l	4g; 4h	$2\times 4i$	$2\times 4j$
[3] <i>Pmma</i>	a, b, 3c $x, y, \frac{1}{3}z;$ $\pm(0, 0, \frac{1}{3})$	2a; 4i	2b; 4j	2c; 4i	2d; 4j	$3\times 2e$	$3\times 2f$	4g; 8l	4h; 8l	$3\times 4i$	$3\times 4j$
[p] <i>Pmma</i>	a, b, pc $x, y, \frac{1}{p}z;$ $+(0, 0, \frac{u}{p})$	2a; $\frac{p-1}{2}\times 4i$	2b; $\frac{p-1}{2}\times 4j$	2c; $\frac{p-1}{2}\times 4i$	2d; $\frac{p-1}{2}\times 4j$	$p\times 2e$	$p\times 2f$	4g; $\frac{p-1}{2}\times 8l$	4h; $\frac{p-1}{2}\times 8l$	$p\times 4i$	$p\times 4j$
	$p = \text{prime} > 2; u = 1, \dots, p-1$									$p\times 4k$	$p\times 8l$

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 $P2_1/m\bar{2}/m2/a$

No. 51

 $Pmma$

Axes	Coordinates	Wyckoff positions									
		2a	2b	2c	2d	2e	2f	4g	4h	4i 4k	4j 8l
Enlarged unit cell, non-isomorphic											
[2] $Aema$ (64)	a, 2b, 2c $x, \frac{1}{2}y, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$ $\cong Cmce$ 2b, 2c, a $\frac{1}{2}y, \frac{1}{2}z, x; +(\frac{1}{2}, 0, 0)$	4a; 4b	8d	8f	8c	8f	8e	$2 \times 8d$	16g	$2 \times 8f$	16g
[2] $Aema$ (64)	a, 2b, 2c $x, \frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$ $\cong Cmce$ 2b, 2c, a $\frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z, x; +(\frac{1}{2}, 0, 0)$	8d	4a; 4b	8c	8f	8e	8f	$2 \times 8d$	16g	16g	$2 \times 8f$
[2] $Aema$ (64)	a, 2b, 2c $x, \frac{1}{2}y, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$ $\cong Cmce$ 2b, 2c, a $\frac{1}{2}y, \frac{1}{2}z + \frac{1}{4}, x; +(\frac{1}{2}, 0, 0)$	8f	8c	4a; 4b	8d	8f	8e	16g	$2 \times 8d$	16g	$2 \times 16g$
[2] $Aema$ (64)	a, 2b, 2c $x, \frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$ $\cong Cmce$ 2b, 2c, a $\frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z + \frac{1}{4}, x; +(\frac{1}{2}, 0, 0)$	8c	8f	8d	4a; 4b	8e	8f	16g	$2 \times 8d$	16g	$2 \times 16g$
[2] $Amma$ (63)	a, 2b, 2c $x, \frac{1}{2}y, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$ $\cong Cmcm$ 2b, 2c, a $\frac{1}{2}y, \frac{1}{2}z, x; +(\frac{1}{2}, 0, 0)$	4a; 4b	8e	8f	8d	$2 \times 4c$	8g	$2 \times 8e$	16h	$2 \times 8f$	16h
[2] $Amma$ (63)	a, 2b, 2c $x, \frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$ $\cong Cmcm$ 2b, 2c, a $\frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z, x; +(\frac{1}{2}, 0, 0)$	8e	4a; 4b	8d	8f	8g	$2 \times 4c$	$2 \times 8e$	16h	$2 \times 8f$	$2 \times 8g$
[2] $Amma$ (63)	a, 2b, 2c $x, \frac{1}{2}y, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$ $\cong Cmcm$ 2b, 2c, a $\frac{1}{2}y, \frac{1}{2}z + \frac{1}{4}, x; +(\frac{1}{2}, 0, 0)$	8f	8d	4a; 4b	8e	$2 \times 4c$	8g	16h	$2 \times 8e$	$2 \times 8f$	$2 \times 8g$
[2] $Amma$ (63)	a, 2b, 2c $x, \frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$ $\cong Cmcm$ 2b, 2c, a $\frac{1}{2}y + \frac{1}{4}, \frac{1}{2}z + \frac{1}{4}, x; +(\frac{1}{2}, 0, 0)$	8d	8f	8e	4a; 4b	8g	$2 \times 4c$	16h	$2 \times 8e$	16h	$2 \times 16h$
[2] $Pmmn$ (59)	a, 2b, c origin 1: $x + \frac{1}{4}, \frac{1}{2}y + \frac{1}{4}, z; +(\frac{1}{2}, 0, 0)$ origin 2: $x, \frac{1}{2}y, z; +(\frac{1}{2}, 0, 0)$	4c	4f	4d	4f	4e	2a; 2b	8g	8g	8g	$2 \times 4f$
[2] $Pmmn$ (59)	a, 2b, c origin 1: $x + \frac{1}{4}, \frac{1}{2}y, z; +(\frac{1}{2}, 0, 0)$ origin 2: $x, \frac{1}{2}y + \frac{1}{4}, z; +(\frac{1}{2}, 0, 0)$	4f	4c	4f	4d	2a; 2b	4e	8g	8g	$2 \times 4f$	8g
[2] $Pbma$ (57)	a, 2b, c $x, \frac{1}{2}y, z; +(\frac{1}{2}, 0, 0)$ $\cong Pbcm$ c, a, 2b $z, x, \frac{1}{2}y; +(\frac{1}{2}, 0, 0)$	4a	4d	4b	4d	4c	4d	8e	8e	8e	$2 \times 4d$
[2] $Pbma$ (57)	a, 2b, c $x, \frac{1}{2}y + \frac{1}{4}, z; +(\frac{1}{2}, 0, 0)$ $\cong Pbcm$ c, a, 2b $z, x, \frac{1}{2}y + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$	4d	4a	4d	4b	4d	4c	8e	8e	8e	$2 \times 8e$
[2] $Pmca$ (57)	a, b, 2c $x, y, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$ $\cong Pbcm$ b, 2c, a $y, \frac{1}{2}z, x; +(\frac{1}{2}, 0, 0)$	4a	4b	4c	4c	4d	4d	8e	$2 \times 4c$	8e	8e
[2] $Pmca$ (57)	a, b, 2c $x, y, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$ $\cong Pbcm$ b, 2c, a $y, \frac{1}{2}z + \frac{1}{4}, x; +(\frac{1}{2}, 0, 0)$	4c	4c	4a	4b	4d	4d	$2 \times 4c$	8e	8e	$2 \times 4d$
[2] $Pcma$ (55)	a, b, 2c $x, y, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$ $\cong Pbam$ 2c, a, b $\frac{1}{2}z, x, y; +(\frac{1}{2}, 0, 0)$	2a; 2c	2b; 2d	4g	4h	4g	4h	4e; 4f	8i	$2 \times 4g$	$2 \times 4h$
[2] $Pcma$ (55)	a, b, 2c $x, y, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$ $\cong Pbam$ 2c, a, b $\frac{1}{2}z + \frac{1}{4}, x, y; +(\frac{1}{2}, 0, 0)$	4g	4h	2a; 2c	2b; 2d	4g	4h	8i	4e; 4f	$2 \times 4g$	$2 \times 4h$
[2] $Pcca$ (54)	a, b, 2c $x, y, \frac{1}{2}z; +(\frac{1}{2}, 0, 0)$	4a	4b	4c	4c	4d	4e	8f	$2 \times 4c$	8f	8f
[2] $Pcca$ (54)	a, b, 2c $x, y, \frac{1}{2}z + \frac{1}{4}; +(\frac{1}{2}, 0, 0)$	4c	4c	4a	4b	4d	4e	$2 \times 4c$	8f	8f	$2 \times 8f$
[2] $Pbmn$ (53)	a, 2b, c $x, \frac{1}{2}y, z; +(\frac{1}{2}, 0, 0)$ $\cong Pmna$ 2b, c, a $\frac{1}{2}y, z, x; +(\frac{1}{2}, 0, 0)$	2a; 2b	4e	2c; 2d	4f	4h	4g	$2 \times 4e$	$2 \times 4f$	$2 \times 4h$	8i
[2] $Pbmn$ (53)	a, 2b, c $x, \frac{1}{2}y + \frac{1}{4}, z; +(\frac{1}{2}, 0, 0)$ $\cong Pmna$ 2b, c, a $\frac{1}{2}y + \frac{1}{4}, z, x; +(\frac{1}{2}, 0, 0)$	4e	2a; 2b	4f	2c; 2d	4g	4h	$2 \times 4e$	$2 \times 4f$	8i	$2 \times 8i$

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