*International Tables for Crystallography* (2006). Vol. B, Figure 1.5.5.4, p. 177.



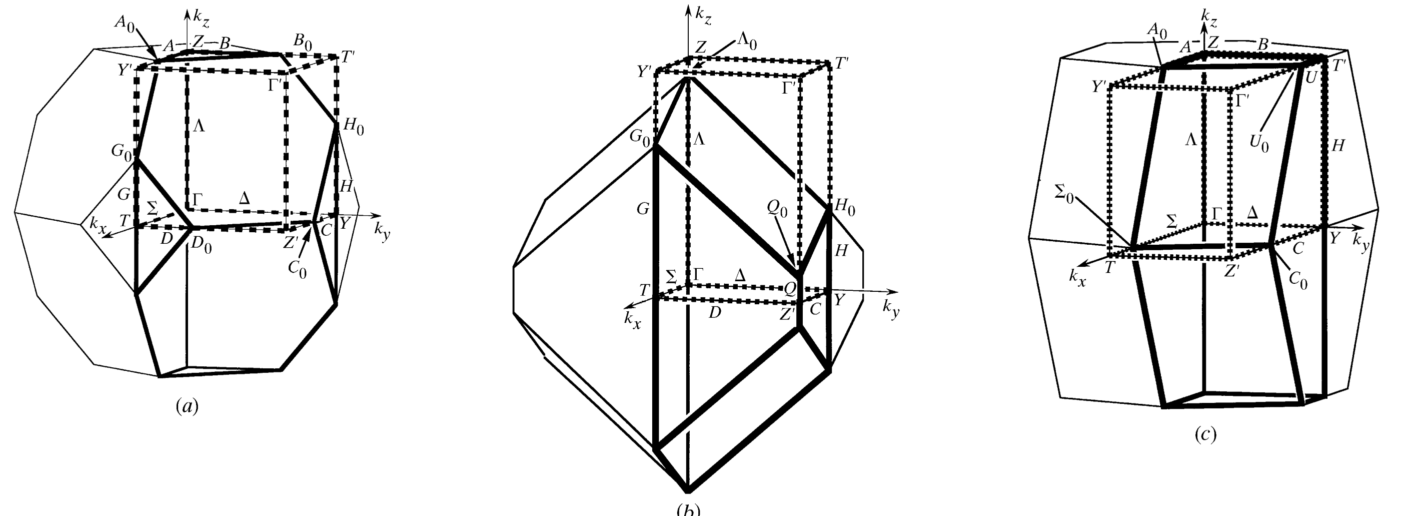


Fig. 1.5.5.4. Symmorphic space group $Imm2$ (isomorphic to the reciprocal-space group $\mathcal{G}^*$ of $mm2F$).

(*a*) Brillouin zone (thin lines), representation domain (thick lines) and asymmetric unit (dashed lines, partly protruding) imbedded in the Brillouin zone, which is an orthorhombic cuboctahedron. The diagram is drawn for $a^{*2}=9$, $b^{*2}=8$, $c^{*2}=7$, *i.e.* $a^{*2}+b^{*2} > c^{*2}$. The endpoint of line $A$ is $A_0$ *etc.*, the free coordinate of $A_0$ is $a_0$ *etc.* Asymmetric unit $\Gamma TZ'YZY'\Gamma'T'$ of $Imm2$, *IT* A, p. 246. The part $\Gamma TD_0C_0YG_0H_0ZA_0B_0$ is common to both bodies; the part $A_0Y'\Gamma'T'B_0G_0H_0D_0Z'C_0$ is equivalent to the part of the representation domain with negative $z$ values through a twofold screw rotation $2_1$ around the axis $\frac{1}{4},\frac{1}{4},z$. Coordinates of the *points*: $\Gamma=0,0,0\sim\Gamma'=\frac{1}{2},\frac{1}{2},\frac{1}{2}$; $Y=0,\frac{1}{2},0\sim Y'=\frac{1}{2},0,\frac{1}{2}$; $Z=0,0,\frac{1}{2}\sim Z'=\frac{1}{2},\frac{1}{2},0$; $T=\frac{1}{2},0,0\sim T'=0,\frac{1}{2},\frac{1}{2}$; $C_0=c_0,\frac{1}{2},0\sim A_0=a_0,0,\frac{1}{2}$; $D_0=\frac{1}{2},d_0,0\sim B_0=0,b_0,\frac{1}{2}$; $G_0=\frac{1}{2},0,g_0\sim H_0=0,\frac{1}{2},h_0$. The coordinates of the points are $c_0=1/4[1-(b^{*2}-c^{*2})/a^{*2}]$; $a_0=1/2-c_0$; $d_0=1/4[1-(a^{*2}-c^{*2})/b^{*2}]$; $b_0=1/2-d_0$; $g_0=1/4[1-(a^{*2}-b^{*2})/c^{*2}]$; $h_0=1/2-g_0$. The sign $\sim$ means symmetrically equivalent. There are no special points. The points $\Gamma$, $T$, $Y$, $Z$, $G_0$ and $H_0$ belong to special lines; $A_0$, $B_0$, $C_0$ and $D_0$ belong to special planes. The points with negative $z$ coordinates are equivalent to those already listed. *Lines*: $\Lambda=\Gamma Z=0,0,z$; $G=TG_0=\frac{1}{2},0,z$; $H=YH_0=0,\frac{1}{2},z$. The lines $\Sigma=\Gamma T=x,0,0$; $C=YC_0=x,\frac{1}{2},0$; $A=ZA_0=x,0,\frac{1}{2}$; $\Delta=\Gamma Y=0,y,0$; $B=ZB_0=0,y,\frac{1}{2}$; $D=TD_0=\frac{1}{2},y,0$; $A_0G_0$, $G_0D_0$, $C_0H_0$ and $H_0B_0$ have no special symmetry but belong to special planes, the lines $D_0C_0$ and $B_0A_0$ belong to the general position $GP$. The lines $\Gamma\bar{Z}$, $T\bar{G}_0$, $Y\bar{H}_0$, $D_0\bar{G}_0$, $C_0\bar{H}_0$, $\bar{G}_0\bar{A}_0$, $\bar{H}_0\bar{B}_0$, $\bar{Z}\bar{A}_0$, $\bar{Z}\bar{B}_0$ and $\bar{A}_0\bar{B}_0$ of the representation domain to the points $\bar{Z}$, $\bar{G}_0$, $\bar{H}_0$, $\bar{A}_0$ and $\bar{B}_0$ with negative $z$ coordinates are equivalent to lines of the asymmetric unit not belonging to the representation domain. *Planes*: $E=\Gamma YH_0B_0Z=0,y,z$; $F=TD_0G_0=\frac{1}{2},y,z$; $J=\Gamma ZA_0G_0T=x,0,z$; $K=YH_0C_0=x,\frac{1}{2},z$. The planes $x$, $y$, 0; $x$, $y$, $\frac{1}{2}$; and $D_0C_0H_0B_0A_0G_0$ belong to the general position $GP$, as do the negative counterparts of the latter two. The planes $\Gamma\bar{Z}\bar{A}_0\bar{G}_0T$, $\Gamma\bar{Z}\bar{B}_0\bar{H}_0Y$, $Y\bar{H}_0C_0$ and $TD_0\bar{G}_0$ of the representation domain to the points $\bar{Z}$, $\bar{A}_0$, $\bar{B}_0$, $\bar{G}_0$ and $\bar{H}_0$ with negative $z$ coordinates are equivalent to planes of the asymmetric unit not belonging to the representation domain. For the parameter ranges see Table 1.5.5.4.

(*b*) Brillouin zone (thin lines), representation domain (thick lines) and asymmetric unit (dashed lines, partly protruding) imbedded in the Brillouin zone, which is an orthorhombic elongated rhombdodecahedron. The diagram is drawn for $a^{*2}=4$, $b^{*2}=9$, $c^{*2}=16$, *i.e.* $a^{*2}+b^{*2} < c^{*2}$. The endpoint of line $G$ is $G_0$ *etc.*, the free coordinate of $G_0$ is $g_0$ *etc.* Asymmetric unit $\Gamma TZ'YZY'\Gamma'T'$ of $Imm2$, *IT* A, p. 246. The part $\Gamma TZ'YQ_0H_0\Lambda_0G_0$ is common to both bodies; the part $ZY'\Gamma'T'\Lambda_0G_0Q_0H_0$ is equivalent to the part of the representation domain with negative $z$ values through a twofold screw rotation $2_1$ around the axis $\frac{1}{4}$, $\frac{1}{4}$, $z$. Coordinates of the *points*: $\Gamma=0,0,0\sim\Gamma'=\frac{1}{2},\frac{1}{2},\frac{1}{2}$; $Y=0,\frac{1}{2},0\sim Y'=\frac{1}{2},0,\frac{1}{2}$; $Z=0,0,\frac{1}{2}\sim Z'=\frac{1}{2},\frac{1}{2},0$; $T=\frac{1}{2},0,0\sim T'=0,\frac{1}{2},\frac{1}{2}$; $\Lambda_0=0,0,\lambda_0\sim Q_0=\frac{1}{2},\frac{1}{2},q_0$; $G_0=\frac{1}{2},0,g_0\sim H_0=0,\frac{1}{2},h_0$. The coordinates of the points are $\lambda_0=1/4[1+(a^{*2}+b^{*2})/c^{*2}]$; $q_0=1/2-\lambda_0$; $g_0=1/4[1+(b^{*2}-a^{*2})/c^{*2}]$; $h_0=1/2-g_0$. The sign $\sim$ means symmetrically equivalent. There are no special points. The points $\Gamma$, $T$, $Y$, $Z'$, $\Lambda_0$, $Q_0$, $G_0$ and $H_0$ belong to special lines. The points with negative $z$ coordinates are equivalent to those already listed. *Lines*: $\Lambda=\Gamma\Lambda_0=0,0,z$; $Q=Z'Q_0=\frac{1}{2},\frac{1}{2},z$; $G=TG_0=\frac{1}{2},0,z$; $H=YH_0=0,\frac{1}{2},z$. The lines $\Sigma=\Gamma T=x,0,0$; $C=YZ'=x,\frac{1}{2},0$; $\Delta=\Gamma Y=0,y,0$; $D=TZ'=\frac{1}{2},y,0$; $Q_0G_0$, $G_0\Lambda_0$, $\Lambda_0H_0$ and $H_0Q_0$ have no special symmetry but belong to special planes. The lines $\Gamma\bar{\Lambda}_0$, $Z'\bar{Q}_0$, $T\bar{G}_0$ and $Y\bar{H}_0$ of the representation domain to the points $\bar{\Lambda}$, $\bar{Q}_0$, $\bar{G}_0$ and $\bar{H}_0$ with negative $z$ coordinates are equivalent to lines of the asymmetric unit not belonging to the representation domain. *Planes*: $E=\Gamma YH_0\Lambda_0=0,y,z$; $F=TZ'Q_0G_0=\frac{1}{2},y,z$; $J=\Gamma\Lambda_0G_0T=x,0,z$; $K=YH_0Q_0Z'=x,\frac{1}{2},z$. The planes $x$, $y$, 0 and $\Lambda_0G_0Q_0H_0$ belong to the general position $GP$, as does the negative counterpart of $\Lambda_0G_0Q_0H_0$. The planes $\Gamma\bar{\Lambda}_0\bar{G}_0T$, $\Gamma\bar{\Lambda}_0\bar{H}_0Y$, $Y\bar{H}_0\bar{Q}_0Z'$ and $T\bar{G}_0\bar{Q}_0Z'$ of the representation domain to the points $\bar{\Lambda}$, $\bar{Q}_0$, $\bar{G}_0$ and $\bar{H}_0$ with negative $z$ coordinates are equivalent to planes of the asymmetric unit not belonging to the representation domain. For the parameter ranges see Table 1.5.5.4.

(*c*) Brillouin zone (thin lines), representation domain (thick lines) and asymmetric unit (dashed lines, partly protruding) imbedded in the Brillouin zone, which is an orthorhombic elongated rhombdodecahedron. The diagram is drawn for $a^{*2}=49$, $b^{*2}=9$, $c^{*2}=16$, *i.e.* $a^{*2} > b^{*2}+c^{*2}$. The endpoint of line $A$ is $A_0$ *etc.*, the free coordinate of $A_0$ is $a_0$ *etc.* Asymmetric unit $\Gamma TZ'YZY'\Gamma'T'$ of $Imm2$, *IT* A, p. 246. The part $\Gamma\Sigma_0C_0YZA_0U_0T'$ is common to both bodies; the part $\Sigma_0TZ'C_0A_0Y'\Gamma'U_0$ is equivalent to the part of the representation domain with negative $z$ values through a twofold screw rotation $2_1$ around the axis $\frac{1}{4}$, $\frac{1}{4}$, $z$. Coordinates of the *points*: $\Gamma=0,0,0\sim\Gamma'=\frac{1}{2},\frac{1}{2},\frac{1}{2}$; $Y=0,\frac{1}{2},0\sim Y'=\frac{1}{2},0,\frac{1}{2}$; $Z=0,0,\frac{1}{2}\sim Z'=\frac{1}{2},\frac{1}{2},0$; $T=\frac{1}{2},0,0\sim T'=0,\frac{1}{2},\frac{1}{2}$; $\Sigma_0=\sigma_0,0,0\sim U_0=u_0,\frac{1}{2},\frac{1}{2}$; $A_0=a_0,0,\frac{1}{2}\sim C_0=c_0,\frac{1}{2},0$. The coordinates of the points are $\sigma_0=1/4[1+(b^{*2}+c^{*2})/a^{*2}]$; $u_0=1/2-\sigma_0$; $a_0=1/4[1+(b^{*2}-c^{*2})/a^{*2}]$; $c_0=1/2-a_0$. The sign $\sim$ means symmetrically equivalent. There are no special points. The points $\Gamma$, $Z$, $Y$ and $T'$ belong to special lines, $\Sigma_0$, $U_0$, $A_0$ and $C_0$ belong to special planes. The points with negative $z$ coordinates are equivalent to those already listed. *Lines*: $\Lambda=\Gamma Z=0,0,z$; $H=YT'=0,\frac{1}{2},z$. The lines $\Sigma=\Gamma\Sigma_0=x,0,0$; $U=T'U_0=x,\frac{1}{2},\frac{1}{2}$; $A=ZA_0=x,0,\frac{1}{2}$; $C=YC_0=x,\frac{1}{2},0$; $\Delta=\Gamma Y=0,y,0$; $B=ZT'=0,y,\frac{1}{2}$; $U_0A_0$, $A_0\Sigma_0$, $\Sigma_0C_0$ and $C_0U_0$ have no special symmetry but belong to special planes. The lines $\Gamma\bar{Z}$ and $Y\bar{T}'$ of the representation domain to the points $\bar{Z}$ and $\bar{T}'$ with negative $z$ coordinates are equivalent to lines of the asymmetric unit not belonging to the representation domain. *Planes*: $E=\Gamma YT'Z=0,y,z$; $J=\Gamma\Sigma_0A_0Z=x,0,z$; $K=YC_0U_0T'=x,\frac{1}{2},z$. The planes $x$, $y$, 0; $x$, $y$, $\frac{1}{2}$; and $\Sigma_0C_0U_0A_0$ belong to the general position $GP$, as does the negative counterpart of $\Sigma_0C_0U_0A_0$. The planes $\Gamma\bar{Z}\bar{T}'Y$, $\Gamma\Sigma_0\bar{A}_0\bar{Z}$ and $Y\bar{T}'\bar{U}_0C_0$ of the representation domain to the points $\bar{Z}$, $\bar{T}'$, $\bar{A}_0$ and $\bar{U}_0$ with negative $z$ coordinates are equivalent to planes of the asymmetric unit not belonging to the representation domain. For the parameter ranges see Table 1.5.5.4.

The fourth possible type of Brillouin zone with $b^{*2} > a^{*2}+c^{*2}$ is similar to that displayed in (*c*). It can be obtained from this by exchanging $\mathbf{a}^*$ and $\mathbf{b}^*$ and changing the letters for the points, lines and planes correspondingly.





references