|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MONOCLINIC | Laue class 2/*m* |  |  |  |  |  |
| Unique axis *b* | | | Extinction symbol | Laue class 1 2/*m* 1 | | |
| Reflection | conditions |  | Point group | | |
| *hkl*  0*kl hk*0 | *h*0*l*  *h*00 00*l* | 0*k*0 |  | 2 | *m* | 2/*m* |
|  |  |  | *P*1–1 | ***P*121** (3)\* | ***P*1*m*1** (6)\* | ***P*1 2/*m* 1** (10)\* |
|  |  | *k* | *P*12(1)1 | ***P*12(1)1** (4)\* |  | ***P*1 2(1)**/***m* 1** (11)\* |
|  | *h* |  | *P*1*a*1 |  | *P*1*a*1 (7) | *P*1 2/*a* 1 (13) |
|  | *h* | *k* | *P*1 2(1)/*a* 1 |  |  | *P*1 2(1)/*a* 1 (14) |
|  | *l* |  | *P*1*c*1 |  | ***P*1*c*1** (7)\* | ***P*1 2**/***c* 1** (13)\* |
|  | *l* | *k* | *P*1 2(1)/*c* 1 |  |  | ***P*1 2(1)**/***c* 1** (14)\* |
|  | *h* + *l* |  | *P*1*n*1 |  | *P*1*n*1 (7) | *P*1 2/*n* 1 (13) |
|  | *h* + *l* | *k* | *P*1 2(1)/*n* 1 |  |  | *P*1 2(1)/*n* 1 (14) |
| *h* + *k* | *h* | *k* | *C*1–1 | ***C*121** (5)\* | ***C*1*m*1** (8)\* | ***C*1 2**/***m* 1** (12)\* |
| *h* + *k* | *h*, *l* | *k* | *C*1*c*1 |  | ***C*1*c*1** (9)\* | ***C*1 2**/***c* 1** (15)\* |
| *k* + *l* | *l* | *k* | *A*1–1 | *A*121 (5) | *A*1*m*1 (8) | *A*1 2/*m* 1 (12) |
| *k* + *l* | *h*, *l* | *k* | *A*1*n*1 |  | *A*1*n*1 (9) | *A*1 2/*n* 1 (15) |
| *h* + *k* + *l* | *h* + *l* | *k* | *I*1–1 | *I*121 (5) | *I*1*m*1 (8) | *I*1 2/*m* 1 (12) |
| *h* + *k* + *l* | *h*, *l* | *k* | *I*1*a*1 |  | *I*1*a*1 (9) | *I*1 2/*a* 1 (15) |
|  |  |  |  |  |  |  |
| Unique axis *c* | | | Extinction symbol | Laue class 1 1 2/*m* | | |
| Reflection | conditions |  | Point group | | |
| *hkl*  0*kl h*0*l* | *hk*0  *h*00 0*k*0 | 00*l* |  | 2 | *m* | 2/*m* |
|  |  |  | *P*11– | *P*112 (3) | *P*11*m* (6) | *P*11 2/*m* (10) |
|  |  | *l* | *P*112(1) | *P*112(1) (4) |  | *P*11 2(1)/*m* (11) |
|  | *h* |  | *P*11*a* |  | *P*11*a* (7) | *P*11 2/*a* (13) |
|  | *h* | *l* | *P*11 2(1)/*a* |  |  | *P*11 2(1)/*a* (14) |
|  | *k* |  | *P*11*b* |  | *P*11*b* (7) | *P*11 2/*b* (13) |
|  | *k* | *l* | *P*11 2(1)/*b* |  |  | *P*11 2(1)/*b* (14) |
|  | *h* + *k* |  | *P*11*n* |  | *P*11*n* (7) | *P*11 2/*n* (13) |
|  | *h* + *k* | *l* | *P*11 2(1)/*n* |  |  | *P*11 2(1)/*n* (14) |
| *h* + *l* | *h* | *l* | *B*11– | *B*112 (5) | *B*11*m* (8) | *B*11 2/*m* (12) |
| *h* + *l* | *h*, *k* | *l* | *B*11*n* |  | *B*11*n* (9) | *B*11 2/*n* (15) |
| *k* + *l* | *k* | *l* | *A*11– | *A*112 (5) | *A*11*m* (8) | *A*11 2/*m* (12) |
| *k* + *l* | *h*, *k* | *l* | *A*11*a* |  | *A*11*a* (9) | *A*11 2/*a* (15) |
| *h* + *k* + *l* | *h* + *k* | *l* | *I*11– | *I*112 (5) | *I*11*m* (8) | *I*11 2/*m* (12) |
| *h* + *k* + *l* | *h*, *k* | *l* | *I*11*b* |  | *I*11*b* (9) | *I*11 2/*b* (15) |
|  |  |  |  |  |  |  |
| Unique axis *a* |  |  | Extinction symbol | Laue class 2/*m* 1 1 | | |
| Reflection | conditions |  | Point group |  |  |
| *hkl*  *h*0*l hk*0 | 0*kl*  0*k*0 00*l* | *h*00 |  | 2 | *m* | 2/*m* |
|  |  |  | *P*–11 | *P*211 (3) | *Pm*11 (6) | *P*2/*m* 11 (10) |
|  |  | *h* | *P*2(1)11 | *P*2(1)11 (4) |  | *P*2(1)/*m* 11 (11) |
|  | *k* |  | *Pb*11 |  | *Pb*11 (7) | *P*2/*b* 11 (13) |
|  | *k* | *h* | *P*2(1)/*b* 11 |  |  | *P*2(1)/*b* 11 (14) |
|  | *l* |  | *Pc*11 |  | *Pc*11 (7) | *P*2/*c* 11 (13) |
|  | *l* | *h* | *P*2(1)/*c* 11 |  |  | *P*2(1)/*c* 11 (14) |
|  | *k* + *l* |  | *Pn*11 |  | *Pn*11 (7) | *P*2/*n* 11 (13) |
|  | *k* + *l* | *h* | *P*2(1)/*n* 11 |  |  | *P*2(1)/*n* 11 (14) |
| *h* + *k* | *k* | *h* | *C*–11 | *C*211 (5) | *Cm*11 (8) | *C*2/*m* 11 (12) |
| *h* + *k* | *k*, *l* | *h* | *Cn*11 |  | *Cn*11 (9) | *C*2/*n* 11 (15) |
| *h* + *l* | *l* | *h* | *B*–11 | *B*211 (5) | *Bm*11 (8) | *B*2/*m* 11 (12) |
| *h* + *l* | *k*, *l* | *h* | *Bb*11 |  | *Bb*11 (9) | *B*2/*b* 11 (15) |
| *h* + *k* + *l* | *k* + *l* | *h* | *I*–11 | *I*211 (5) | *Im*11 (8) | *I*2/*m* 11 (12) |
| *h* + *k* + *l* | *k*, *l* | *h* | *Ic*11 |  | *Ic*11 (9) | *I*2/*c* 11 (15) |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ORTH | ORHO | MBIC |  |  |  |  |  | Laue class | *mmm* (2/*m* 2/*m* 2/*m*) |  |
| Reflection conditions |  |  |  |  |  |  |  | Point group |  |  |
| *hkl* | 0*kl* | *h*0*l* | *hk*0 | *h*00 | 0*k*0 | 00*l* | Extinction  symbol | 222 | *mm*2  *m*2*m*  2*mm* | *mmm* |
|  |  |  |  |  |  |  | *P*--- --- --- | ***P*222** (16)\* | ***Pmm*2** (25)\* | ***Pmmm*** (47)\* |
|  |  |  |  |  |  |  |  |  | *Pm*2*m* (25) |  |
|  |  |  |  |  |  |  |  |  | *P*2*mm* (25) |  |
|  |  |  |  |  |  | *l* | *P*--- ---2(1) | ***P*222(1)** (17)\* |  |  |
|  |  |  |  |  | *k* |  | *P*---2(1)--- | *P*22(1)2 (17) |  |  |
|  |  |  |  |  | *k* | *l* | *P*---2(1)2(1) | *P*22(1)2(1) (18) |  |  |
|  |  |  |  | *h* |  |  | *P*2(1)--- --- | *P*2(1)22 (17) |  |  |
|  |  |  |  | *h* |  | *l* | *P*2(1)---2(1) | *P*2(1)22(1) (18) |  |  |
|  |  |  |  | *h* | *k* |  | *P*2(1)2(1)--- | ***P*2(1)2(1)2** (18)\* |  |  |
|  |  |  |  | *h* | *k* | *l* | *P*2(1)2(1)2(1) | ***P*2(1)2(1)2(1)** (19)\* |  |  |
|  |  |  | *h* | *h* |  |  | *P*--- ---*a* |  | *Pm*2*a* (28) |  |
|  |  |  |  |  |  |  |  |  | *P*2(1)*ma* (26) | ***Pmma*** (51)\* |
|  |  |  | *k* |  | *k* |  | *P*--- ---*b* |  | *Pm*2(1)*b* (26) |  |
|  |  |  |  |  |  |  |  |  | *P*2*mb* (28) | *Pmmb* (51) |
|  |  |  | *h* + *k* | *h* | *k* |  | *P*--- ---*n* |  | *Pm*2(1)*n* (31) |  |
|  |  |  |  |  |  |  |  |  | *P*2(1)*mn* (31) | ***Pmmn*** (59)\* |
|  |  | *h* |  | *h* |  |  | *P*---*a*--- |  | ***Pma*2** (28)\* | *Pmam* (51) |
|  |  |  |  |  |  |  |  |  | *P*2(1)*am* (26) |  |
|  |  | *h* | *h* | *h* |  |  | *P*---*aa* |  | *P*2*aa* (27) | *Pmaa* (49) |
|  |  | *h* | *k* | *h* | *k* |  | *P*---*ab* |  | *P*2(1)*ab* (29) | *Pmab* (57) |
|  |  | *h* | *h* + *k* | *h* | *k* |  | *P*---*an* |  | *P*2*an* (30) | *Pman* (53) |
|  |  | *l* |  |  |  | *l* | *P*---*c*--- |  | ***Pmc*2(1)** (26)\* |  |
|  |  |  |  |  |  |  |  |  | *P*2*cm* (28) | *Pmcm* (51) |
|  |  | *l* | *h* | *h* |  | *l* | *P*---*ca* |  | *P*2(1)*ca* (29) | *Pmca* (57) |
|  |  | *l* | *k* |  | *k* | *l* | *P*---*cb* |  | *P*2*cb* (32) | *Pmcb* (55) |
|  |  | *l* | *h* + *k* | *h* | *k* | *l* | *P*---*cn* |  | *P*2(1)*cn* (33) | *Pmcn* (62) |
|  |  | *h* + *l* |  | *h* |  | *l* | *P*---*n*--- |  | ***Pmn*2(1)** (31)\* |  |
|  |  |  |  |  |  |  |  |  | *P*2(1)*nm* (31) | *Pmnm* (59) |
|  |  | *h* + *l* | *h* | *h* |  | *l* | *P*---*na* |  | *P*2*na* (30) | ***Pmna*** (53)\* |
|  |  | *h* + *l* | *k* | *h* | *k* | *l* | *P*---*nb* |  | *P*2(1)*nb* (33) | *Pmnb* (62) |
|  |  | *h* + *l* | *h* + *k* | *h* | *k* | *l* | *P*---*nn* |  | *P*2*nn* (34) | *Pmnn* (58) |
|  | *k* |  |  |  | *k* |  | *Pb*--- --- |  | *Pbm*2 (28) |  |
|  |  |  |  |  |  |  |  |  | *Pb*2(1)*m* (26) | *Pbmm* (51) |
|  | *k* |  | *h* | *h* | *k* |  | *Pb*---*a* |  | *Pb*2(1)*a* (29) | *Pbma* (57) |
|  | *k* |  | *k* |  | *k* |  | *Pb*---*b* |  | *Pb*2*b* (27) | *Pbmb* (49) |
|  | *k* |  | *h* + *k* | *h* | *k* |  | *Pb*---*n* |  | *Pb*2*n* (30) | *Pbmn* (53) |
|  | *k* | *h* |  | *h* | *k* |  | *Pba*--- |  | ***Pba*2** (32)\* | ***Pbam*** (55)\* |
|  | *k* | *h* | *h* | *h* | *k* |  | *Pbaa* |  |  | *Pbaa* (54) |
|  | *k* | *h* | *k* | *h* | *k* |  | *Pbab* |  |  | *Pbab* (54) |
|  | *k* | *h* | *h* + *k* | *h* | *k* |  | *Pban* |  |  | ***Pban*** (50)\* |
|  | *k* | *l* |  |  | *k* | *l* | *Pbc*--- |  | *Pbc*2(1) (29) | ***Pbcm*** (57)\* |
|  | *k* | *l* | *h* | *h* | *k* | *l* | *Pbca* |  |  | ***Pbca*** (61)\* |
|  | *k* | *l* | *k* |  | *k* | *l* | *Pbcb* |  |  | *Pbcb* (54) |
|  | *k* | *l* | *h* + *k* | *h* | *k* | *l* | *Pbcn* |  |  | ***Pbcn*** (60)\* |
|  | *k* | *h* + *l* |  | *h* | *k* | *l* | *Pbn*--- |  | *Pbn*2(1) (33) | *Pbnm* (62) |
|  | *k* | *h* + *l* | *h* | *h* | *k* | *l* | *Pbna* |  |  | *Pbna* (60) |
|  | *k* | *h* + *l* | *k* | *h* | *k* | *l* | *Pbnb* |  |  | *Pbnb* (56) |
|  | *k* | *h* + *l* | *h* + *k* | *h* | *k* | *l* | *Pbnn* |  |  | *Pbnn* (52) |
|  | *l* |  |  |  |  | *l* | *Pc*--- --- |  | *Pcm*2(1) (26) |  |
|  |  |  |  |  |  |  |  |  | *Pc*2*m* (28) | *Pcmm* (51) |
|  | *l* |  | *h* | *h* |  | *l* | *Pc*---*a* |  | *Pc*2*a* (32) | *Pcma* (55) |
|  | *l* |  | *k* |  | *k* | *l* | *Pc*---*b* |  | *Pc*2(1)*b* (29) | *Pcmb* (57) |
|  | *l* |  | *h* + *k* | *h* | *k* | *l* | *Pc*---*n* |  | *Pc*2(1)*n* (33) | *Pcmn* (62) |
|  | *l* | *h* |  | *h* |  | *l* | *Pca*--- |  | ***Pca*2(1)** (29)\* | *Pcam* (57) |
|  | *l* | *h* | *h* | *h* |  | *l* | *Pcaa* |  |  | *Pcaa* (54) |
|  | *l* | *h* | *k* | *h* | *k* | *l* | *Pcab* |  |  | *Pcab* (61) |
|  | *l* | *h* | *h* + *k* | *h* | *k* | *l* | *Pcan* |  |  | *Pcan* (60) |
|  | *l* | *l* |  |  |  | *l* | *Pcc*--- |  | ***Pcc*2** (27)\* | ***Pccm*** (49)\* |
|  | *l* | *l* | *h* | *h* |  | *l* | *Pcca* |  |  | ***Pcca*** (54)\* |
|  | *l* | *l* | *k* |  | *k* | *l* | *Pccb* |  |  | *Pccb* (54) |
|  | *l* | *l* | *h* + *k* | *h* | *k* | *l* | *Pccn* |  |  | ***Pccn*** (56)\* |
|  | *l* | *h* + *l* |  | *h* |  | *l* | *Pcn* --- |  | *Pcn*2 (30) | *Pcnm* (53) |
|  | *l* | *h* + *l* | *h* | *h* |  | *l* | *Pcna* |  |  | *Pcna* (50) |
|  | *l* | *h* + *l* | *k* | *h* | *k* | *l* | *Pcnb* |  |  | *Pcnb* (60) |
|  | *l* | *h* + *l* | *h* + *k* | *h* | *k* | *l* | *Pcnn* |  |  | *Pcnn* (52) |
|  | *k* + *l* |  |  |  | *k* | *l* | *Pn* --- --- |  | *Pnm*2(1) (31) | *Pnmm* (59) |
|  |  |  |  |  |  |  |  |  | *Pn*2(1)*m* (31) |  |
|  | *k* + *l* |  | *h* | *h* | *k* | *l* | *Pn*---*a* |  | *Pn*2(1)*a* (33) | ***Pnma*** (62)\* |
|  | *k* + *l* |  | *k* |  | *k* | *l* | *Pn*---*b* |  | *Pn*2*b* (30) | *Pnmb* (53) |
|  | *k* + *l* |  | *h* + *k* | *h* | *k* | *l* | *Pn*---*n* |  | *Pn*2*n* (34) | *Pnmn* (58) |
|  | *k* + *l* | *h* |  | *h* | *k* | *l* | *Pna* --- |  | ***Pna*2(1)** (33)\* | *Pnam* (62) |
|  | *k* + *l* | *h* | *h* | *h* | *k* | *l* | *Pnaa* |  |  | *Pnaa* (56) |
|  | *k* + *l* | *h* | *k* | *h* | *k* | *l* | *Pnab* |  |  | *Pnab* (60) |
|  | *k* + *l* | *h* | *h* + *k* | *h* | *k* | *l* | *Pnan* |  |  | *Pnan* (52) |
|  | *k* + *l* | *l* |  |  | *k* | *l* | *Pnc* --- |  | ***Pnc*2** (30)\* | *Pncm* (53) |
|  | *k* + *l* | *l* | *h* | *h* | *k* | *l* | *Pnca* |  |  | *Pnca* (60) |
| *hkl* | 0*kl* | *h*0*l* | *hk*0 | *h*00 | 0*k*0 | 00*l* | Extinction  symbol | 222 | *mm*2  *m*2*m*  2*mm* | *mmm* |
|  |  |  |  |  |  |  |  |  |  |  |
|  | *k* + *l* | *l* | *k* |  | *k* | *l* | *Pncb* |  |  | *Pncb* (50) |
|  | *k* + *l* | *l* | *h* + *k* | *h* | *k* | *l* | *Pncn* |  |  | *Pncn* (52) |
|  | *k* + *l* | *h* + *l* |  | *h* | *k* | *l* | *Pnn* --- |  | ***Pnn*2** (34)\* | ***Pnnm*** (58)\* |
|  | *k* + *l* | *h* + *l* | *h* | *h* | *k* | *l* | *Pnna* |  |  | ***Pnna*** (52)\* |
|  | *k* + *l* | *h* + *l* | *k* | *h* | *k* | *l* | *Pnnb* |  |  | *Pnnb* (52) |
|  | *k* + *l* | *h* + *l* | *h* + *k* | *h* | *k* | *l* | *Pnnn* |  |  | ***Pnnn*** (48)\* |
| *h* + *k* | *k* | *h* | *h* + *k* | *h* | *k* |  | *C* --- --- --- | ***C*222** (21)\* | ***Cmm*2** (35)\* | ***Cmmm*** (65)\* |
|  |  |  |  |  |  |  |  |  | *Cm*2*m* (38) |  |
|  |  |  |  |  |  |  |  |  | *C*2*mm* (38) |  |
| *h* + *k* | *k* | *h* | *h* + *k* | *h* | *k* | *l* | *C*--- ---2(1) | ***C*222(1)** (20)\* |  |  |
| *h* + *k* | *k* | *h* | *h*, *k* | *h* | *k* |  | *C*--- ---(*ab*) |  | *Cm*2*e* (39) | ***Cmme*** (67)\* |
|  |  |  |  |  |  |  |  |  | *C*2*me* (39) |  |
| *h* + *k* | *k* | *h*, *l* | *h* +*k* | *h* | *k* | *l* | *C*---*c* --- |  | ***Cmc*2(1)** (36)\* | ***Cmcm*** (63)\* |
|  |  |  |  |  |  |  |  |  | *C*2*cm* (40) |  |
| *h* + *k* | *k* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *C*---*c*(*ab*) |  | *C*2*ce* (41) | ***Cmce*** (64)\* |
| *h* + *k* | *k*, *l* | *h* | *h* + *k* | *h* | *k* | *l* | *Cc* --- --- |  | *Ccm*2(1) (36) | *Ccmm* (63) |
|  |  |  |  |  |  |  |  |  | *Cc*2*m* (40) |  |
| *h + k* | *k*, *l* | *h* | *h*, *k* | *h* | *k* | *l* | *Cc* ---(*ab*) |  | *Cc*2*e* (41) | *Ccme* (64) |
| *h* + *k* | *k*, *l* | *h*, *l* | *h* + *k* | *h* | *k* | *l* | *Ccc* --- |  | ***Ccc*2** (37)\* | ***Cccm*** (66)\* |
| *h* + *k* | *k*, *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *Ccc*(*ab*) |  |  | ***Ccce*** (68) |
| *h* + *l* | *l* | *h* + *l* | *h* | *h* |  | *l* | *B* --- --- --- | *B*222 (21) | *Bmm*2 (38) | *Bmmm* (65) |
|  |  |  |  |  |  |  |  |  | *Bm*2*m* (35) |  |
|  |  |  |  |  |  |  |  |  | *B*2*mm* (38) |  |
| *h* + *l* | *l* | *h* + *l* | *h* | *h* | *k* | *l* | *B*---2(1)--- | *B*22(1)2 (20) |  |  |
| *h* + *l* | *l* | *h* + *l* | *h*, *k* | *h* | *k* | *l* | *B*--- ---*b* |  | *Bm*2(1)*b* (36) | *Bmmb* (63) |
|  |  |  |  |  |  |  |  |  | *B*2*mb* (40) |  |
| *h* + *l* | *l* | *h*, *l* | *h* | *h* |  | *l* | *B* ---(*ac*)--- |  | *Bme*2 (39) | *Bmem* (67) |
|  |  |  |  |  |  |  |  |  | *B*2*em* (39) |  |
| *h* + *l* | *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *B* ---(*ac*)*b* |  | *B*2*eb* (41) | *Bmeb* (64) |
| *h* + *l* | *k*, *l* | *h* + *l* | *h* | *h* | *k* | *l* | *Bb* --- --- |  | *Bbm*2 (40) | *Bbmm* (63) |
|  |  |  |  |  |  |  |  |  | *Bb*2(1)*m* (36) |  |
| *h* + *l* | *k*, *l* | *h* + *l* | *h*, *k* | *h* | *k* | *l* | *Bb*---*b* |  | *Bb*2*b* (37) | *Bbmb* (66) |
| *h* + *l* | *k*, *l* | *h*, *l* | *h* | *h* | *k* | *l* | *Bb*(*ac*)--- |  | *Bbe*2 (41) | *Bbem* (64) |
| *h* + *l* | *k*, *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *Bb*(*ac*)*b* |  |  | *Bbeb* (68) |
|  |  |  |  |  |  |  |  |  |  |  |
| *hkl* | 0*kl* | *h*0*l* | *hk*0 | *h*00 | 0*k*0 | 00*l* | Extinction  symbol | 222 | *mm*2  *m*2*m*  2*mm* | *mmm* |
|  |  |  |  |  |  |  |  |  |  |  |
| *k + l* | *k* + *l* | *l* | *k* |  | *k* | *l* | *A* --- --- --- | *A*222 (21) | ***Amm*2** (38)\* | *Ammm* (65) |
|  |  |  |  |  |  |  |  |  | *Am*2*m* (38) |  |
|  |  |  |  |  |  |  |  |  | *A*2*mm* (35) |  |
| *k* + *l* | *k* + *l* | *l* | *k* | *h* | *k* | *l* | *A*2(1)--- --- | *A*2(1)22 (20) |  |  |
| *k* + *l* | *k* + *l* | *l* | *h*, *k* | *h* | *k* | *l* | *A*--- ---*a* |  | ***Am*2*a*** (40)\* | *Amma* (63) |
|  |  |  |  |  |  |  |  |  | *A*2(1)*ma* (36) |  |
| *k* + *l* | *k* + *l* | *h*, *l* | *k* | *h* | *k* | *l* | *A*---*a* --- |  | ***Ama*2** (40)\* | *Amam* (63) |
|  |  |  |  |  |  |  |  |  | *A*2(1)*am* (36) |  |
| *k* + *l* | *k* + *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *A*---*aa* |  | *A*2*aa* (37) | *Amaa* (66) |
| *k* + *l* | *k*, *l* | *l* | *k* |  | *k* | *l* | *A*(*bc*)--- --- |  | ***Aem*2** (39)\* | *Aemm* (67) |
|  |  |  |  |  |  |  |  |  | *Ae*2*m* (39) |  |
| *k* + *l* | *k*, *l* | *l* | *h*, *k* | *h* | *k* | *l* | *A*(*bc*)---*a* |  | *Ae*2*a* (41) | *Aema* (64) |
| *k* + *l* | *k*, *l* | *h*, *l* | *k* | *h* | *k* | *l* | *A*(*bc*)*a* --- |  | ***Aea*2** (41)\* | *Aeam* (64) |
| *k* + *l* | *k*, *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *A*(*bc*)*aa* |  |  | *Aeaa* (68) |
| *h* + *k* + *l* | *k* + *l* | *h* + *l* | *h* + *k* | *h* | *k* | *l* | *I* --- --- --- | ***I*222** (23)\*  ***I*2(1)2(1)2(1)** (24)\* | ***Imm*2** (44)\*  *Im*2*m* (44) | ***Immm*** (71)\* |
|  |  |  |  |  |  |  |  |  | *I*2*mm* (44) |  |
| *h* + *k* + *l* | *k* + *l* | *h* + *l* | *h*, *k* | *h* | *k* | *l* | *I* --- ---(*ab*) |  | *Im*2*a* (46) | ***Imma*** (74)\* |
|  |  |  |  |  |  |  |  |  | *I*2*mb* (46) | *Immb* (74) |
| *h* + *k* + *l* | *k* + *l* | *h*, *l* | *h* + *k* | *h* | *k* | *l* | *I* ---(*ac*)--- |  | ***Ima*2** (46)\* | *Imam* (74) |
|  |  |  |  |  |  |  |  |  | *I*2*cm* (46) | *lmcm* (74) |
| *h* + *k* + *l* | *k* + *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *I* --- *cb* |  | *I*2*cb* (45) | *Imcb* (72) |
| *h* + *k* + *l* | *k*, *l* | *h* + *l* | *h* + *k* | *h* | *k* | *l* | *I*(*bc*)--- --- |  | *Iem*2 (46)  *Ie*2*m* (46) | *Iemm* (74) |
| *h* + *k* + *l* | *k*, *l* | *h* + *l* | *h*, *k* | *h* | *k* | *l* | *Ic* ---*a* |  | *Ic*2*a* (45) | *Icma* (72) |
| *h* + *k* + *l* | *k*, *l* | *h*, *l* | *h* + *k* | *h* | *k* | *l* | *Iba* --- |  | ***Iba*2** (45)\* | ***Ibam*** (72)\* |
| *h* + *k* + *l* | *k*, *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *Ibca* |  |  | ***Ibca*** (73)\*  *Icab* (73) |
| *h* + *k*, *h* + *l*, *k* + *l* | *k*, *l* | *h*, *l* | *h*, *k* | *h* | *k* | *l* | *F* --- --- --- | ***F*222** (22)\* | ***Fmm*2** (42)\* | ***Fmmm*** (69)\* |
|  |  |  |  |  |  |  |  |  | *Fm*2*m* (42)  *F*2*mm* (42) |  |
| *h +* *k*, *h* + *l*, *k* + *l* | *k*, *l* | *h* + *l* = 4*n*; *h*, *l* | *h* + *k* = 4*n*; *h*, *k* | *h =* 4*n* | *k* = 4*n* | *l* = 4*n* | *F*---*dd* |  | *F*2*dd* (43) |  |
| *h* + *k*, *h +* *l*, *k* + *l* | *k* + *l* = 4*n*; *k*, *l* | *h*, *l* | *h* + *k* = 4*n*; *h*, *k* | *h* = 4*n* | *k* = 4*n* | *l* = 4*n* | *Fd*---*d* |  | *Fd*2*d* (43) |  |
| *h +* *k*, *h* + *l*, *k* + *l* | *k* + *l* = 4*n*; *k*, *l* | *h* + *l =* 4*n*; *h*, *l* | *h*, *k* | *h* = 4*n* | *k* = 4*n* | *l* = 4*n* | *Fdd*--- |  | ***Fdd*2** (43)\* |  |
| *h* + *k*, *h* + *l*, *k* + *l* | *k* + *l* = 4*n*; *k*, *l* | *h* + *l* = 4*n*; *h*, *l* | *h* + *k* = 4*n*; *h*, *k* | *h* = 4*n* | *k* = 4*n* | *l* = 4*n* | *Fddd* |  |  | ***Fddd*** (70)\* |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TET | RAG | ON | AL |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | Laue class  4/*m* |  |  | 4/*mmm* | (4/*m* | 2/*m* | 2/*m*) |
| Ref | lec | tio | n | con | dit | ion | Extinction symbol | Point group |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *hkl* | *hk*0 | 0*kl* | *hhl* | 00*l* | 0*k*0 | *hh*0 |  | 4 | -4 | 4/*m* | 422 | 4*mm* | -42*m* -4*m*2 | 4/*mmm* |
|  |  |  |  |  |  |  | *P* --- --- --- | *P*4 (75) | *P*-4 (81) | *P*4/*m* (83) | *P*422 (89) | *P*4*mm* (99) | *P*-42*m* (111) | *P*4/*mmm* (123) |
|  |  |  |  |  |  |  |  |  |  |  |  |  | *P*-4*m*2 (115) |  |
|  |  |  |  |  | *k* |  | *P*---2(1)--- |  |  |  | *P*42(1)2 (90) |  | *P*-42(1)*m* (113) |  |
|  |  |  |  | *l* |  |  | *P*4(2)--- --- | *P*4(2) (77) |  | *P*4(2)/*m* (84) | *P*4(2)22 (93) |  |  |  |
|  |  |  |  | *l* | *k* |  | *P*4(2)2(1)--- |  |  |  | *P*4(2)2(1)2 (94) |  |  |  |
|  |  |  |  | *l* = 4*n* |  |  | *P*4(1)--- --- | *P*4(1) (76)  *P*4(3) (78) |  |  | *P*4(1)22 (91)  *P*4(3)22 (95) |  |  |  |
|  |  |  |  | *l* = 4*n* | *k* |  | *P*4(1)2(1)--- |  |  |  | *P*4(1)2(1)2 (92)  *P*4(3)2(1)2 (96) |  |  |  |
|  |  |  | *l* | *l* |  |  | *P*--- ---*c* |  |  |  |  | *P*4(2)*mc* (105) | *P*-42*c* (112) | *P*4(2)/*mmc* (131) |
|  |  |  | *l* | *l* | *k* |  | *P*---2(1)*c* |  |  |  |  |  | *P*-42(1)*c* (114) |  |
|  |  | *k* |  |  | *k* |  | *P* --- *b* --- |  |  |  |  | *P*4*bm* (100) | *P*-4*b*2 (117) | *P*4/*mbm* (127) |
|  |  | *k* | *l* | *l* | *k* |  | *P*--- *bc* |  |  |  |  | *P*4(2)*bc* (106) |  | *P*4(2)/*mbc* (135) |
|  |  | *l* |  | *l* |  |  | *P* --- *c* --- |  |  |  |  | *P*4(2)*cm* (101) | *P*-4*c*2 (116) | *P*4(2)/*mcm* (132) |
|  |  | *l* | *l* | *l* |  |  | *P*--- *cc* |  |  |  |  | *P*4*cc* (103) |  | *P*4/*mcc* (124) |
|  |  | *k* + *l* |  | *l* | *k* |  | *P* --- *n* --- |  |  |  |  | *P*4(2)*nm* (102) | *P*-4*n*2 (118) | *P*4(2)/*mnm* (136) |
|  |  | *k* + *l* | *l* | *l* | *k* |  | *P*--- *nc* |  |  |  |  | *P*4*nc* (104) |  | *P*4/*mnc* (128) |
|  | *h* + *k* |  |  |  | *k* |  | *Pn* --- --- |  |  | *P*4/*n* (85) |  |  |  | *P*4/*nmm* (129) |
|  | *h* + *k* |  |  | *l* | *k* |  | *P*4(2)/*n*--- --- |  |  | *P*4(2)/*n* (86) |  |  |  |  |
|  | *h* + *k* |  | *l* | *l* | *k* |  | *Pn* --- *c* |  |  |  |  |  |  | *P*4(2)/*nmc* (137) |
|  | *h* + *k* | *k* |  |  | *k* |  | *Pnb* --- |  |  |  |  |  |  | *P*4/*nbm* (125) |
|  | *h* + *k* | *k* | *l* | *l* | *k* |  | *Pnbc* |  |  |  |  |  |  | *P*4(2)/*nbc* (133) |
|  | *h* + *k* | *l* |  | *l* | *k* |  | *Pnc* --- |  |  |  |  |  |  | *P*4(2)/*ncm* (138) |
|  | *h* + *k* | *l* | *l* | *l* | *k* |  | *Pncc* |  |  |  |  |  |  | *P*4/*ncc* (130) |
|  | *h* + *k* | *k* + *l* |  | *l* | *k* |  | *Pnn* --- |  |  |  |  |  |  | *P*4(2)/*nnm* (134) |
|  | *h* + *k* | *k* + *l* | *l* | *l* | *k* |  | *Pnnc* |  |  |  |  |  |  | *P*4/*nnc* (126) |
| *h* + *k* + *l* | *h* + *k* | *k* + *l* | *l* | *l* | *k* |  | *I*--- --- --- | *I*4 (79) | *I*-4 (82) | *I*4/*m* (87) | *I*422 (97) | *I*4*mm* (107) | *I*-42*m* (121)  *I*-4*m*2 (119) | *I*4/*mmm* (139) |
| *h* + *k* + *l* | *h* + *k* | *k* + *l* | *l* | *l* = 4*n* | *k* |  | *I*4(1)--- --- | *I*4(1) (80) |  |  | *I*4(1)22 (98) |  |  |  |
| *h* + *k* + *l* | *h* + *k* | *k* + *l* | X | *l* = 4*n* | *k* | *h* | *I*--- ---*d* |  |  |  |  | *I*4(1)*md* (109) | *I*-42*d* (122) |  |
| *h* + *k* + *l* | *h* + *k* | *k*,*l* | *l* | *l* | *k* |  | *I*--- *c* --- |  |  |  |  | *I*4*cm* (108) | *I*-4*c*2 (120) | *I*4/*mcm* (140) |
| *h* + *k* + *l* | *h* + *k* | *k*,*l* | X | *l* = 4*n* | *k* | *h* | *I*--- *cd* |  |  |  |  | *I*4(1)*cd* (110) |  |  |
| *h* + *k* + *l* | *h*,*k* | *k* + *l* | *l* | *l* = 4*n* | *k* |  | *I*4(1)/*a*--- --- |  |  | *I*4(1)/*a* (88) |  |  |  |  |
| *h* + *k* + *l* | *h*,*k* | *k* + *l* | X | *l* = 4*n* | *k* | *h* | *Ia*--- *d* |  |  |  |  |  |  | *I*4(1)/*amd* (141) |
| *h* + *k* + *l* | *h*,*k* | *k*, *l* | X | *l* = 4*n* | *k* | *h* | *Iacd* |  |  |  |  |  |  | *I*4(1)/*acd* (142) |
| X 2*h* + *l* =  4*n*; *l*. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TRIGONAL |  |  |  |  | Laue | class |  |  |  |  |  |  |
| Reflection  conditions |  |  |  |  | -3 |  | -3*m*1 (-3  2/*m* 1)  -3*m* |  |  | 31*m* (-3  1 2/*m*) |  |  |
| Hexagonal  axes |  |  |  | Extinction  symbol | Point group |  |  |  |  |  |  |  |
| *hkil* | *h*-*h*0*l* | *hh*2*hl* | 000*l* |  | 3 | -3 | 321  32 | 3m1  3m | -3m1  -3m | 312 | 31*m* | -31*m* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | *P* --- --- --- | *P*3 (143) | *P*-3 (147) | *P*321 (150) | *P*3*m*1 (156) | *P*-3*m*1 (164) | *P*312 (149) | *P*31*m* (157) | *P*-31*m* (162) |
|  |  |  | *l* = 3*n* | *P*3(1)--- --- | *P*3(1) (144)  *P*3(2) (145) |  | *P*3(1)21 (152)  *P*3(2)21 (154) |  |  | *P*3(1)12 (151)  *P*3(2)12 (153) |  |  |
|  |  | *l* | *l* | *P*--- --- *c* |  |  |  |  |  |  | *P*31*c* (159) | *P*-31*c* (163) |
|  | *l* |  | *l* | *P* --- *c* --- |  |  |  | *P*3*cl* (158) | *P*-3*c*1 (165) |  |  |  |
| -*h* + *k* + *l* = 3*n* | *h* + *l* = 3*n* | *l* = 3*n* | *l =* 3*n* | *R*(obv)--- --- | *R*3 (146) | *R*-3 (148) | *R*32 (155) | *R*3*m* (160) | *R*-3*m* (166) |  |  |  |
| -*h* + *k* + *l* = 3*n* | *h* + *l* = 3*n; l* | *l =* 3*n* | *l* = 6*n* | *R*(obv)---*c* |  |  |  | *R*3*c* (161) | *R*-3*c* (167) |  |  |  |
| *h* - *k* + *l =* 3*n* | -*h* + *l* = 3*n* | *l* = 3*n* | *l* = 3*n* | *R*(rev)--- --- | *R*3 (146) | *R*-3 (148) | *R*32 (155) | *R*3*m* (160) | *R*-3*m* (166) |  |  |  |
| *h* - *k* + *l =* 3*n* | -*h* + *l* = 3*n;* *l* | *l* = 3*n* | *l* = 6*n* | *R*(rev)---*c* |  |  |  | *R*3*c* (161) | *R*-3*c* (167) |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| Rhombohedral  axes |  |  |  | Extinction  symbol | Point group |  |  |  |  |  |  |  |
| *hkl* |  | *hhl* | *hhh* |  | 3 | -3 | 32 | 3m | -3m |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | *R* --- --- | *R*3(146) | *R*-3 (148) | *R*32 (155) | *R*3*m* (160) | *R*-3*m* (166) |  |  |  |
|  |  | *l* | *h* | *R*---*c* |  |  |  | *R*3*c* (161) | *R*-3*c* (167) |  |  |  |

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| HEXAGONAL |  |  |  | Laue | class |  |  |  |  |  |
|  |  |  |  | 6/*m* |  |  | 6/*mmm*  (6/*m* 2/*m* 2/*m*) |  |  |  |
| Reflection  conditions |  |  | Extinction  symbol | Point group |  |  |  |  |  |  |
| *h*-*h*0*l* | *hh*2*hl* | 000*l* |  | 6 | -6 | 6/*m* | 622 | 6*mm* | -62*m*  -6*m*2 | 6/*mmm* |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | *P* --- --- --- | *P*6 (168) | *P*-6 (174) | *P*6/*m* (175) | *P*622 (177) | *P*6*mm* (183) | *P*-62*m* (189) | *P*6/*mmm* (191) |
|  |  |  |  |  |  |  |  |  | *P*-6*m*2 (187) |  |
|  |  | *l* | *P*6(3)--- --- | *P*6(3) (173) |  | *P*6(3)/*m* (176) | *P*6(3)22 (182) |  |  |  |
|  |  | *l* = 3*n* | *P*6(2)--- --- | *P*6(2) (171)  *P*6(4) (172) |  |  | *P*6(2)22 (180)  *P*6(4)22 (181) |  |  |  |
|  |  | *l* = 6*n* | *P*6(1)--- --- | *P*6(1) (169)  *P*6(3) (170) |  |  | *P*6(1)22 (178)  *P*6(5)22 (179) |  |  |  |
|  | *l* | *l* | *P*--- ---*c* |  |  |  |  | *P*6(3)*mc* (186) | *P*-62*c* (190) | *P*6(3)/*mmc* (194) |
| *l* |  | *l* | *P*--- *c* --- |  |  |  |  | *P*6(3)*cm* (185) | *P*-6*c*2 (188) | *P*6(3)/*mcm* (193) |
| *l* | *l* | *l* | *P*--- *cc* |  |  |  |  | *P*6*cc* (184) |  | *P*6/*mcc* (192) |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CUBIC |  |  |  |  | Laue | class |  |  |  |
|  |  |  |  |  | *m*-3 (2/*m* -3) |  | *m*-3*m* (4/*m* -3 2/*m*) |  |  |
| Reflection  conditions |  |  |  | Extinction  symbol | Point group |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| *hkl* | 0*kl* | *hhl* | 00*l* |  | 23 | m-3 | 432 | -43*m* | *m*-3*m* |
|  |  |  |  | *P* --- --- --- | *P*23 (195) | *Pm*-3 (200) | *P*432 (207) | *P*-43*m* (215) | *Pm*-3*m* (221) |
|  |  |  | *l* | *P*2(1)--- ---  *P*4(2)--- --- | *P*2(1)3 (198) |  | *P*4(2)32 (208) |  |  |
|  |  |  | *l* = 4*n* | *P*4(1)--- --- |  |  | *P*4(1)32 (213)  *P*4(3)32 (212) |  |  |
|  |  | *l* | *l* | *P*--- ---*n* |  |  |  | *P*-43*n* (218) | *Pm*-3*n* (223) |
|  | *k* |  | *l* | *Pa* --- --- |  | *Pa*-3 (205) |  |  |  |
|  | *k* + *l* |  | *l* | *Pn* --- --- |  | *Pn*-3 (201) |  |  | *Pn*-3*m* (224) |
|  | *k* + *l* | *l* | *l* | *Pn*---*n* |  |  |  |  | *Pn*-3*n* (222) |
| *h +* *k + l* | *k + l* | *l* | *l* | *I* --- --- --- | *I*23 (197)  *I*2(1)3 (199) | *Im*-3 (204) | *I*432 (211) | *I*-43*m* (217) | *Im-*3*m* (229) |
| *h +* *k* + *l* | *k* + *l* | *l* | *l* = 4*n* | *I*4(1)--- --- |  |  | *I*4(1)32 (214) |  |  |
| *h* + *k* + *l* | *k* + *l* | 2*h* + *l* = 4*n*, *l* | *l* = 4*n* | *I*--- ---*d* |  |  |  | *I*-43*d* (220) |  |
| *h* + *k* + *l* | *k*, *l* | *l* | *l* | *Ia* --- --- |  | *Ia*-3 (206) |  |  |  |
| *h* + *k* + *l* | *k*, *l* | 2*h* + *l* = 4*n*, *l* | *l* = 4*n* | *Ia*---*d* |  |  |  |  | *Ia*-3*d* (230) |
| *h* + *k*, *h* + *l*, *k* + *l* | *k*, *l* | *h* + *l* | *l* | *F* --- --- --- | *F*23 (196) | *Fm*-3 (202) | *F*432 (209) | *F*-43*m* (216) | *Fm*-3*m* (225) |
| *h* + *k*, *h* + *l*, *k* + *l* | *k*, *l* | *h* + *l* | *l* = 4*n* | *F*4(1)--- --- |  |  | *F*4(1)32 (210) |  |  |
| *h* + *k*, *h* + *l*, *k* + *l* | *k*, *l* | *h*, *l* | *l* | *F*--- ---*c* |  |  |  | *F*-43*c* (219) | *Fm*-3*c* (226) |
| *h* + *k*, *h* + *l*, *k* + *l* | *k* + *l* + 4*n*, *k*, *l* | *h* + *l* | *l* = 4*n* | *Fd*--- --- |  | *Fd*-3 (203) |  |  | *Fd*-3*m* (227) |
| *h* + *k*, *h* + *l*, *k* + *l* | *k* + *l* = 4*n*, *k*, *l* | *h*, *l* | *l* = 4*n* | *Fd*---*c* |  |  |  |  | *Fd*-3*c* (228) |