

Coordinates of Symmetry Points in the Brillouin Zones[1]

| Point | Triclinic | Simple Monoclinic | Center Monoclinic | Simple Orthorhombic | Base Center Orthorhombic | Face Centered Orthorhombic | Body Centered Orthorhombic |
|-----------|---------------------------------------|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| Γ | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 |
| Δ | | | | 0 α 0 | 0 α 0 | 0 α 0 | 0 α 0 |
| Λ | | 0 0 α | 0 0 α | 0 0 α | 0 0 α | 0 0 α | 0 0 α |
| Σ | | | | α 0 0 | α 0 0 | α 0 0 | α 0 0 |
| A | | $\frac{1}{2} - \frac{1}{2} 0$ | $\frac{1}{2} 0 0$ | $\alpha 0 \frac{1}{2}$ | $\alpha 0 \frac{1}{2}$ | $\alpha 0 \frac{1}{2}$ | |
| B | | $\frac{1}{2} 0 0$ | | $0 \alpha \frac{1}{2}$ | $0 \alpha \frac{1}{2}$ | $0 \alpha \frac{1}{2}$ | |
| C | | $0 \frac{1}{2} \frac{1}{2}$ | | $\alpha \frac{1}{2} 0$ | $\alpha \frac{1}{2} 0$ | $\alpha \frac{1}{2} 0$ | |
| D | | $\frac{1}{2} 0 \frac{1}{2}$ | | $\frac{1}{2} \alpha 0$ | $\frac{1}{4} \frac{1}{4} \frac{1}{4}$ | | $\alpha \frac{1}{4} \frac{1}{4}$ |
| E | | $\frac{1}{2} - \frac{1}{2} \frac{1}{2}$ | | $\alpha \frac{1}{2} \frac{1}{2}$ | | | |
| F | | | | | | | |
| G | | | | $\frac{1}{2} 0 \alpha$ | | | $\frac{1}{2} 0 \alpha$ |
| H | | | | $0 \frac{1}{2} \alpha$ | $0 \frac{1}{2} \alpha$ | $0 \frac{1}{2} \alpha$ | |
| L | | | $\frac{1}{2} \frac{1}{4} \frac{1}{4}$ | | | $\frac{1}{4} \frac{1}{4} \frac{1}{4}$ | |
| M | | | $\frac{1}{2} 0 \frac{1}{2}$ | | | | |
| N | | | | | | | |
| P | | | | $\frac{1}{2} \alpha \frac{1}{2}$ | | | $\frac{1}{4} \frac{1}{4} \alpha$ |
| Q | | | | $\frac{1}{2} \frac{1}{2} \alpha$ | | | $\frac{1}{4} \alpha \frac{1}{4}$ |
| R | $\frac{1}{2} \frac{1}{2} \frac{1}{2}$ | | | $\frac{1}{2} \frac{1}{2} \frac{1}{2}$ | $\frac{1}{4} \frac{1}{4} \frac{1}{2}$ | | $\frac{1}{4} 0 \frac{1}{4}$ |
| S | | | | $\frac{1}{2} \frac{1}{2} 0$ | $\frac{1}{4} \frac{1}{4} 0$ | | $0 \frac{1}{4} \frac{1}{4}$ |
| T | | | | $0 \frac{1}{2} \frac{1}{2}$ | $0 \frac{1}{2} \frac{1}{2}$ | $0 \frac{1}{2} \frac{1}{2}$ | $\frac{1}{4} \frac{1}{4} 0$ |
| U | $\frac{1}{2} 0 \frac{1}{2}$ | $\frac{1}{2} - \frac{1}{2} \alpha$ | $\frac{1}{2} 0 \alpha$ | $\frac{1}{2} 0 \frac{1}{2}$ | | $\alpha \frac{1}{2} \frac{1}{2}$ | $\frac{1}{2} \alpha 0$ |
| V | $\frac{1}{2} 0 \frac{1}{2}$ | $\frac{1}{2} 0 \alpha$ | $0 \frac{1}{4} \frac{1}{4}$ | | | | |
| W | | $0 \frac{1}{2} \alpha$ | | | | | $\frac{1}{4} \frac{1}{4} \frac{1}{4}$ |
| X | $\frac{1}{2} 0 0$ | | | $\frac{1}{2} 0 0$ | | | $\frac{1}{2} 0 0$ |
| Y | | $0 \frac{1}{2} 0$ | $0 0 \frac{1}{2}$ | $0 \frac{1}{2} 0$ | $0 \frac{1}{2} 0$ | $0 \frac{1}{2} 0$ | |
| Z | $0 0 \frac{1}{2}$ | $0 0 \frac{1}{2}$ | | $0 0 \frac{1}{2}$ | $0 0 \frac{1}{2}$ | $0 0 \frac{1}{2}$ | |

Coordinates of Symmetry Points in the Brillouin Zones[1]

| Point | Simple | BC | SC | FCC | BCC | Rhombohedral | Hexagonal |
|------------|-------------------------------------|-------------------------------------|-------------------------------------|---|-------------------------------------|-------------------------------------|--|
| Tetragonal | Tetragonal | | | | | | |
| Γ | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | 0 0 0 |
| Δ | $0\alpha 0$ | $0\alpha 0$ | $0\alpha 0$ | $0\alpha 0$ | $0\alpha 0$ | | 00α |
| Λ | 00α | 00α | $\alpha\alpha\alpha$ | $\alpha\alpha\alpha$ | $\alpha\alpha\alpha$ | 00α | $\alpha\alpha 0$ |
| Σ | $\alpha\alpha 0$ | $\alpha\alpha 0$ | $\alpha\alpha 0$ | $\alpha\alpha 0$ | $\alpha\alpha 0$ | $\alpha 00$ | $\alpha 00$ |
| A | $\frac{1}{2}\frac{1}{2}\frac{1}{2}$ | | | | | | $00\frac{1}{2}$ |
| B | | | | | | | |
| C | | | | | | | |
| D | | | | | $\frac{1}{4}\frac{1}{4}\alpha$ | | |
| E | | | | | | | |
| F | | | | | $\alpha(\frac{1}{2}-\alpha)\alpha$ | $\frac{1}{2}00$ | |
| G | | | | | $\alpha(\frac{1}{2}-\alpha)0$ | | |
| H | | | | | $0\frac{1}{2}0$ | | $\frac{1}{3}\frac{1}{3}\frac{1}{3}$ |
| K | | | | | | | $\frac{1}{3}\frac{1}{3}0$ |
| L | | | | $\frac{1}{4}\frac{1}{4}\frac{1}{4}$ | | $\frac{1}{6}\frac{1}{6}\frac{1}{6}$ | $\frac{1}{2}0\frac{1}{2}$ |
| M | $\frac{1}{2}\frac{1}{2}0$ | $\frac{1}{2}\frac{1}{2}0$ | $\frac{1}{2}\frac{1}{2}0$ | | | | $\frac{1}{2}00$ |
| N | | $\frac{1}{4}\frac{1}{4}\frac{1}{4}$ | | | $\frac{1}{4}\frac{1}{4}0$ | | |
| P | | $0\frac{1}{2}\frac{1}{4}$ | | | $\frac{1}{4}\frac{1}{4}\frac{1}{4}$ | $\frac{2}{3}\frac{1}{3}\alpha$ | $\frac{1}{3}\frac{1}{3}\alpha$ |
| Q | | $\alpha(\frac{1}{2}-\alpha)\alpha$ | | $\frac{1}{4}(\frac{1}{2}-\alpha)\alpha$ | | | $\alpha\alpha\frac{1}{2}$ |
| R | $0\frac{1}{2}\frac{1}{2}$ | | $\frac{1}{2}\frac{1}{2}\frac{1}{2}$ | | | | $\alpha 0\frac{1}{2}$ |
| S | $\alpha\alpha\frac{1}{2}$ | | $\alpha\alpha\alpha$ | $\alpha\frac{1}{2}\alpha$ | | | $(\frac{1}{2}-\alpha)2\alpha\frac{1}{2}$ |
| T | $\alpha\frac{1}{2}\frac{1}{2}$ | | $\frac{1}{2}\frac{1}{2}\alpha$ | | | $\frac{2}{3}\frac{1}{3}\frac{1}{6}$ | $(\frac{1}{2}-\alpha)2\alpha 0$ |
| U | $0\alpha\frac{1}{2}$ | | | | | | $\frac{1}{2}0\alpha$ |
| V | $\frac{1}{2}\frac{1}{2}\alpha$ | $\frac{1}{2}\frac{1}{2}\alpha$ | | $\alpha\frac{1}{2}0$ | | | |
| W | $0\frac{1}{2}\alpha$ | $0\frac{1}{2}\alpha$ | | $\frac{1}{4}\frac{1}{2}0$ | | | |
| X | $0\frac{1}{2}0$ | $0\frac{1}{2}0$ | $0\frac{1}{2}0$ | $0\frac{1}{2}0$ | | | |
| Y | $\alpha\frac{1}{2}0$ | $\alpha\frac{1}{2}0$ | | | | $\alpha\frac{1}{3}\frac{1}{6}$ | |
| Z | $00\frac{1}{2}$ | | $\alpha\frac{1}{2}0$ | | | | |

References

- [1] Melvin Lax. *Symmetry principles in solid state and molecular physics*. John Wiley and Sons, USA, 1974.