Hybrid twins: somebody chooses one out of N - we take them all!

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Limits of the reticular theory of twinning

Twins with the same twin index and obliquity do not necessarily occur with the same frequency – ex. albite (010) and pericline [010] twins in triclinic pseudo-monoclinic plagioclases. Twins with higher index / obliquity occur sometimes more frequently than twins with lower twin index / obliquity – contradicting the “necessary” condition – ex. Saint Andrews cross twin \((n = 12)\) more frequent than Greek cross twin \((n = 6)\) in staurolite.
Friedelian twins

• The probability of occurrence on a twin is inversely proportional to the twin index and to the obliquity

• Friedel's empirical criterion: $n \leq 6$, $\omega \leq 6^\circ$

• Twins for which the above criterion is obeyed are termed “Friedelian twins”
Effective twin index: \( \frac{10}{(3+2)} = 2.0 \)
\( \{012\} \) twin in forsterite \( Pbnm \)

- \([016]\) \( n = 13, \omega = 0.5^\circ \)
- \([02\ 11]\) \( n = 12, \omega = 0.9^\circ \)
- \([015]\) \( n = 11, \omega = 2.5^\circ \)
- \([029]\) \( n = 10, \omega = 4.4^\circ \)

\( n_E = 13/4 = 3.2 \)
In a cubic lattice, for each \((hkl)\) plane there is a direction \([hkl]\) exactly perpendicular.

\[ n_{E} = \frac{29}{6} = 4.8 \]