Twinning investigation via the primitive cell of Bravais lattices

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It is known that symmetry of the crystal structure lower than that of the corresponding Bravais lattice may trigger twinning [1]. Therefore, an analysis of the metric [2] symmetry of the Bravais lattice is a necessary step both to unravel real twins and to investigate the possibility of twinning.

The symmetry of a lattice is related to its metric properties; these can be investigated by different methods, like via metric tensor, equivalence of lattice vectors [3], occurrence of twofold axes [4], etc. Without pretension of originality, here we call attention on the importance of inspecting the metric of the primitive cells of the 7 centred Bravais lattices, which may in some cases be particularly remunerative.

(*Pseudo*) *cubic and hR lattices* - The primitive cells of *oI*, *tI*, *cF* and *cI* lattices always show a = b = c, a condition typical of cubic and *hR* lattices. The latter occurs in *cF* ($\alpha = 60^{\circ}$) and *cI* ($\alpha = 109.47^{\circ}$) and is approached in *oI* and *tI* when $\alpha \cong \beta \cong \gamma$. The endemic *hP* sublattice of an *hR* lattice, which occurs also in *cP* ($\alpha = 90^{\circ}$), favours twinning by reticular (pseudo)merohedry.

(*Pseudo*) *hP lattices* – The primitive cells of *mC* and *oC* lattices have a = b, a condition which brings into existence an *hP* (sub)lattice when $\gamma \approx 120^{\circ}$.

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