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Equivalent planes for Laue classes $\bar{3}m1$ and $\bar{3}1m$. Correction of an error in *International Tables for X-ray Crystallography*.

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Abstract

The equivalence relationships for general planes (or reflexions) in Laue class $\bar{3}1m$ are different from those for Laue class $\bar{3}m1$. Table 3.5.1 of *International Tables for X-ray Crystallography* [(1969). Vol. I. Birmingham: Kynoch Press] makes no allowance for these differences. The necessary corrections are given.

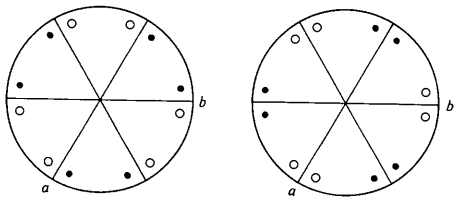
For Laue class $\bar{3}$ (with hexagonal lattice), planes of general form can be grouped into four sets where within each set all planes are equivalent. These sets are

Set (1): $hkil\ ihkl\ kihl\ \bar{h}\bar{k}\bar{i}\bar{l}\ \bar{i}\bar{h}\bar{k}\bar{l}\ \bar{k}\bar{i}\bar{h}\bar{l}$;
Set (2): $hik\bar{l}\ khi\bar{l}\ ikh\bar{l}\ \bar{h}\bar{i}\bar{k}\bar{l}\ \bar{k}\bar{h}\bar{i}\bar{l}\ \bar{i}\bar{k}\bar{h}\bar{l}$;
Set (3): $hikl\ khil\ ikhl\ \bar{h}\bar{i}\bar{k}\bar{l}\ \bar{k}\bar{h}\bar{i}\bar{l}\ \bar{i}\bar{k}\bar{h}\bar{l}$;
Set (4): $hki\bar{l}\ ihk\bar{l}\ kih\bar{l}\ \bar{h}\bar{k}\bar{i}l\ \bar{i}\bar{h}\bar{k}l\ \bar{k}\bar{i}\bar{h}l$.

For Laue classes $\bar{3}m1$ and $\bar{3}1m$ the above relationships also hold, but there are additional equivalence relationships as follows

$\bar{3}m1$: Set (1) ≡ Set (2);
Set (3) ≡ Set (4);

$\bar{3}1m$: Set (1) ≡ Set (3);
Set (2) ≡ Set (4).



$\bar{3}m1$ $\bar{3}1m$

Fig. 1. Stereograms of poles of general equivalent planes in Laue classes $\bar{3}m1$ and $\bar{3}1m$.

Table 1. *Corrections to Table* 3.5.1 *of International Tables for X-ray Crystallography* (1969) *for general planes in Laue classes* $\bar{3}m1$ *and* $\bar{3}1m$

$\bar{3}m1$	*hkil* C (*hki*)	*hik*$\bar{l}$ C (*hik*)	*hikl* C (*hik*)	*hki*$\bar{l}$ C (*hki*)	(unaltered)
	12		12		
$\bar{3}1m$	*hkil* C (*hki*)	*hikl* C (*hik*)	*hik*$\bar{l}$ C (*hik*)	*hki*$\bar{l}$ C (*hki*)	(altered)
	12		12		

These results follow immediately from the stereograms given in Fig. 1.

Table 3.5.1 of *International Tables for X-ray Crystallography* (1969) fails to indicate that the equivalence relationships for general reflexions in Laue class $\bar{3}1m$ are different from those for Laue class $\bar{3}m1$. The necessary corrections to that table are given in Table 1 of the present text.

Reference

International Tables for X-ray Crystallography (1969). Vol. I. Birmingham: Kynoch Press.

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