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Theoretical Analysis of the Crystallography for $DO_3 \rightarrow M18R$ Martensitic Transformation

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Abstract: A mathematical approach of the phenomenological theory has been applied to the martensitic transformation of $DO_3 \rightarrow M18R$ close-packed structure. The crystallography of $DO_3 \rightarrow M18R$ martensitic transformation in Fe-25.8 wt%Mn-7.4wt%Al-0.11wt%C alloy was studied using single crystals. Martensitic crystallographic parameters such as habit plane, magnitude of lattice invariant shear, shape deformation direction and orientation relationships are calculated with new mathematical approach. Phenomenological theoretical calculations were compared with predictions of the phenomenological crystallographic CRAB theory and with experimental observations.

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