

Burgers vector determinations on perovskite and post-perovskite in CaIrO₃

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The thickness-fringe method for the complete determination of the character of a dislocation Burgers vector has been performed in deformed perovskite and post-perovskite with CaIrO₃ composition at 1-3 GPa and 1473-1723 K [1]. By selecting several main zone axes and determining the number of terminating thickness fringes at the exit of a dislocation in weak-beam dark field TEM images [2], the Burgers vectors have been unambiguously determined. The perovskite phase shows {110} polysynthetic twins and curved dislocations with Burgers vectors of [100] and [010] and straight [110] screw dislocations. The post perovskite phase shows a much higher density of [100] screw and edge dislocations on the (010) slip plane and a certain amount of 1/2[110], [001] dislocations. The deformation microtextures of the perovskite phase and the post perovskite phase could be activated by different deformation mechanisms of diffusion-controlled dislocation creep (grain boundary sliding) and dislocation glide, respectively.

References

[1] Walte et al., Submitted to Geophysical Research Letters (2007)

[2] Ishida, Y., Ishida, H., Kohra, K. and Ichinose, H., Philosophical Magazine 42, 453 (1980)