

## Texture Development in Ti and Zr

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### **Further Reading Suggestions**

The DoITPoMS website is a great tool for understanding crystallographic texture, as well as other aspects of materials science, and there are a number of interactive animations that can help with visualising how material texture is represented by pole figures and ODFs.

For a quick summary of the different texture representations see the Appendix in the Recrystallization, which doesn't go into too much detail. However, if you're looking to learn more about texture, including the mathematical formula used for calculation of texture and the effect of texture on the properties of different materials, the Texture and Anisotropy book contains a great deal of information, much more than we have been able to cover in our lecture.

Finally, I have written two papers investigating two-phase texture development during hot-rolling of alpha + beta Zr alloys. The first paper in this list is a systematic study of the alpha and beta phase textures and characterises the effect of rolling at different temperatures. The second paper is a more in-depth study of the deformed alpha + beta phase microstructure, including a 3D EBSD reconstruction of the grains, showing why certain strong textures can appear in both phases during hot-deformation. Reading these will give you an idea of the complexity of texture formation in these materials.

- Website / Videos – DoITPoMS, Crystallographic Texture, [https://www.doitpoms.ac.uk/tlplib/crystallographic\\_texture/printall.php](https://www.doitpoms.ac.uk/tlplib/crystallographic_texture/printall.php)
- Book – Recrystallization and Related Annealing Phenomena by F.J Humphreys and M. Hatherly, 2004, Second Edition, *Appendix 1 Texture*.
- Book – Texture and Anisotropy: Preferred Orientations in Polycrystals and Their Effect on Material Properties by C.N Tomé, H-R. Wenk and U.F. Kocks, 2000, *Chapter 2 Representation of Orientations, Chapter 3 Determination of ODF, Chapter 5 Typical Textures*
- Paper – A detailed study of texture changes during alpha-beta processing of a zirconium alloy, Christopher S. Daniel, Peter D. Honniball, Luke Bradley, Michael Preuss, João Quinta da Fonseca, *Journal of Alloys and Compounds*, 804, 65-83 (2019), <https://doi.org/10.1016/j.jallcom.2019.06.338>
- Paper – Co-deformation and dynamic annealing effects on the texture development during alpha-beta processing of a Zr-Nb alloy, Christopher S. Daniel, Alistair Garner, Peter D. Honniball, Luke Bradley, Michael Preuss, João Quinta da Fonseca, *Acta Materialia*, 205, 116538 (2021), <https://doi.org/10.1016/j.actamat.2020.116538>