



Comparison of neutron and synchrotron diffraction methods in texture analysis of a cold rolled Cu-cube standard sample

Tuesday, 21 March 2023 16:00 (2 hours)

Texture analysis by means of non-destructive, diffraction methods offers the statistical access to the orientation space of crystalline building blocks on microstructural level in materials characterization. Depending on the combination of the investigated material and incident type of radiation, the necessary diffraction signal can be detected from different depth and volumes of a sample. Systematic neutron and synchrotron diffraction measurements on the same sample at different instruments can experimentally demonstrate the advantage and complementary of the respective methods and instruments and allow the performance benchmarking of new ones. A cold rolled Cu-cube of a size of $10 \times 10 \times 11 \text{ mm}^3$ had been investigated using, thermal, monochromatic neutrons at STRESS-SPEC (MLZ) and high-energy x-ray's at P07 (DESY). The choice fell on cold rolled Cu for the sample, since Cu was extensively investigated in the past [1,2]. The absorption effects in the Cu-cube of the above mention size are for the X-ray's significant compared to neutrons and were corrected for a very close agreement to the volume neutron data (without absorption correction). Additionally, the (111), (200) and (220) pole figures by ToF-neutron diffraction at HIPPO (LANCE) were recorded and compared with the monochromatic data.

[1] T. Leffers, R.K. Ray, Progress in Materials Science, 54, 351-396, (2009)

[2] N. Al-hamdany, H.-G. Brokmeier, C. Randau, W. M. Gan, and M. Völler, Cryst. Res. Technol., 49, p. 888, (2014)

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Session Classification: Poster session TUESDAY

Track Classification: Engineering applications