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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

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Citation (APA):

Juul, N. Y., Oddershede, J., & Winther, G. (2017). Comparison of measured lattice rotations of individual grains with crystal plasticity simulations. Abstract from 18th International Conference on Textures of Materials (ICOTOM 18), St. George, Utah, United States.

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Comparison of measured lattice rotations of individual grains with crystal plasticity simulations

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The lattice rotations of more than 300 grains in a 0.7x0.7x0.5 mm³ volume of a 316 stainless steel sample deformed in tension have been monitored by 3DXRD microscopy at CHESS to 5% elongation. The initial grain morphologies and microstructure were also mapped out in high spatial resolution using a near-field detector. This map serves as the input to finite-element based crystal plasticity simulations approximating the modelled crystallographic neighbourhood of individual grains closely. The experimental rotations are compared to the model results, revealing a larger spread of the experimental data. Representative grains are selected for detailed studies to investigate this in more detail.