Adding a new bright field imaging capability to an on-axis TKD detector

Bastos da Silva Fanta, Alice; Fuller, A.; Alimadadi, H.; Todeschini, M.; Goran, D.; Burrows, A.

Publication date:
2019

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

Link back to DTU Orbit

Citation (APA):
Adding a new bright field imaging capability to an on-axis TKD detector

Authors: Bastos S. Fanta A.1, Fuller A.1, Alimadadi H.2, Todeschini M.1, Goran D.3 and Burrows A.1

1 Denmark technical university, DTU Danchip/Cen, Kgs. Lyngby, Denmark; 2 Teknologisk Institute, Aarhus, Denmark; 3 Bruker Nano GmbH, Berlin, Germany

Transmission Kikuchi diffraction (TKD) in the scanning electron microscope has been developing since its emergence less than a decade ago. The recently introduced on-axis detector configuration1, with its optimized geometry, has significantly increased the signal yield and consequently positively influenced the measurement parameters and speed. Furthermore, a Si diodes based imaging system attached to the detector allows the collection of STEM bright and dark field images. When combined with TKD orientation measurements, the SEM is practically transformed into a low voltage transmission electron microscope. In this perspective, a MEMS based heating system, conventionally developed for TEM in-situ investigation, can now be used in the SEM in combination with TKD to investigate dynamical behaviour of thin films and nano particles2. However, one current existing limitation of in-situ microstructure investigations with on-axis TKD is the simultaneous acquisition of STEM image and orientation measurements. The position of the imaging system, located outside the phosphor screen, requires a movement of the camera to acquire high resolution STEM images and high resolution orientation measurements. This work presents a solution to this limitation by adding an additional bright field imaging capability to the center of the screen, which allows simultaneous acquisition of BF images and orientation maps without any detector movement. In this presentation the new detector configuration will be demonstrated and its advantages and limits discussed.

References:
