2nd Workshop « 3D Microtexture analysis »

LEM3 - Labex DAMAS

Metz, October 13-15, 2015

3D EBSD data acquired by crossbeam microscopy in static configuration

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The need for a comprehensive characterization of grains and grain boundaries in 3D has led to the development of methods to directly obtain 3D microstructural data. Especially focused ion beam–scanning electron beam microscopy (FIB–SEM) has become more and more popular. The 3D EBSD analysis consists in (1) milling sections of a given thickness and (2) collecting crystallographic orientation maps with the attached EBSD system.

Commonly used 3D EBSD data acquisition configurations require moving the sample repeatedly between two stage positions. In most cases, the sample/stage is rotated and z-translated to bring this cross-section in EBSD analysis position. Image recognition algorithms are subsequently used for positioning and aligning the specimen. However this applies only for (X,Y) beam movements. It is clear that the most powerful set-up would be a 'static set-up' with no sample movement between milling and EBSD measurement.

In this contribution we present our solution to acquire 3D EBSD data in static condition on a custom made AURIGA 40 – ZEISS microscope equipped with the Bruker EBSD detector. The data acquisition was automated using the API-solutions from the SEM and EBSD manufacturers. The first acquisition results in static position are described. From this starting experience, we discuss the advantages of this new set-up in comparison to the more conventional rotation set-up.

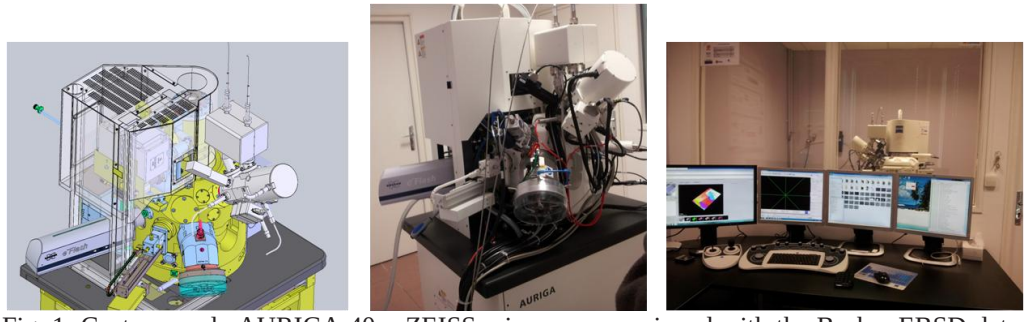

Fig. 1: Custom made AURIGA 40 – ZEISS microscope equipped with the Bruker EBSD detector, as installed at LEM3-CNRS METZ FRANCE

J. Guyon, N. Gey, D. Goran, S. Chalal, F. Pérez-Willard, 'Advancing FIB assisted 3D EBSD using a static sample setup', submitted to Ultramicroscopy