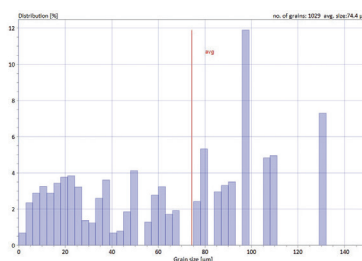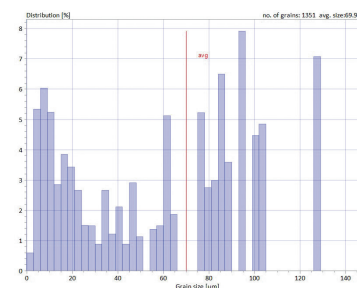**BRUKER**

EBSD

RAPID EBSD

An alternative to fast EBSD mapping

RAPID EBSD is a new and powerful ESPRIT 2 software feature based on a method developed at Imperial College in London, UK.

The new capability combines high quality ARGUS™ ForeScatter (FSE) images with state-of-the-art image segmentation algorithms and sparse EBSD/EDS data acquisition to reconstruct normal EBSD/EDS maps in the shortest time possible.

Benefits
- Increased efficiency
- Fast mapping with long exposure times
- Better statistics in EDS spectra
- Less damage to beam sensitive samples
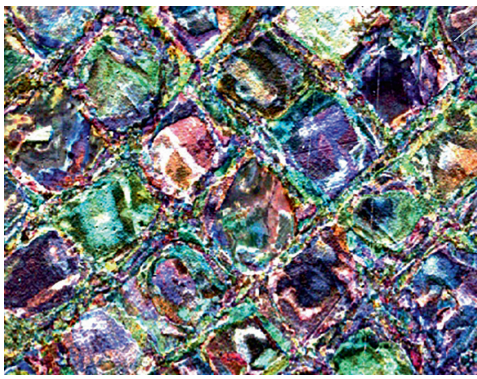- Reduced charging on non-conductive samples

Applications
- Grain size statistics
- Crystallographic texture
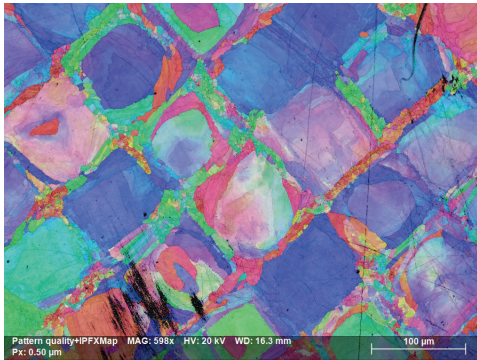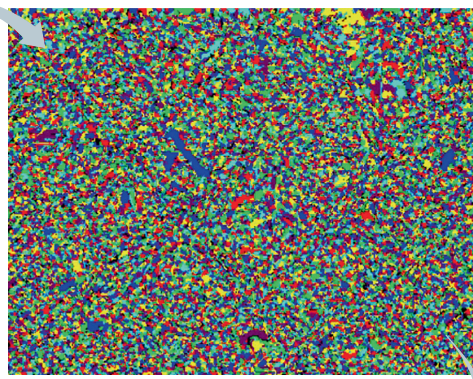- Materials producing very weak diffraction signal
- Beam sensitive samples

Innovation with Integrity

Grain size distr. – standard EBSD

Grain size distr. – RAPID EBSD
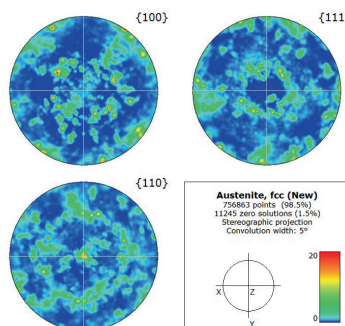
Pole figures – standard EBSD
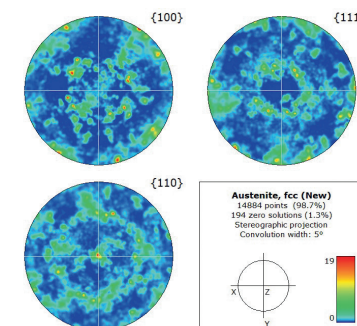
Pole figures - RAPID EBSD

Figure 1
RAPID vs. standard EBSD

1. ARGUS™ FSE image

2. Result of segmentation process
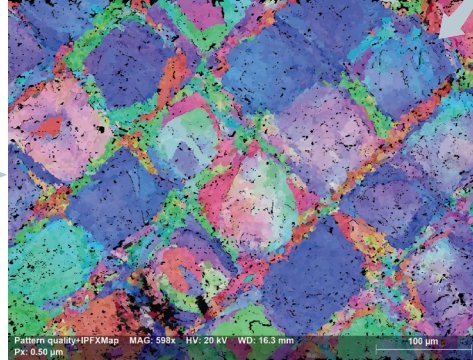
Standard EBSD map

3. Reconstructed RAPID EBSD map

Figure 2
RAPID EBSD workflow: Major steps in the workflow of RAPID EBSD and output comparison vs. standard EBSD mapping: High detail ARGUالسTM FSE image showing orientation contrast in an additively manufactured (AM) austenitic stainless steel (top-left), the resulting image after multiple processing steps, e.g. filtering, segmentation and reconstruction from which a list of measurement points is created (top-right), reconstructed orientation map using RAPID EBSD (bottom-right) and corresponding orientation map acquired using the normal EBSD mapping (bottom-left).

Main features

- Fully automatic:
  – Detector movement
  – ARGUS™ image capture
  – Image processing
  – Sparse EBSD/EDS data acquisition and map reconstruction
- User can change/refine major parameters, e.g., segmentation threshold
- Real time view of map reconstruction during sparse data acquisition

Benchmark details

- ARGUS™ image capture down to 8 μs / px
- Reconstructed map built from an FSE image captured up to 25 times faster vs. an EBSD map acquired at 4,500 fps
- Reduction in total number of data points to be acquired by one to two orders of magnitude
- Total acquisition time for a map of 1M points: ~ 3 min
- No significant difference in mean equivalent diameter compared to standard EBSD maps
- Insignificant or no differences between crystallographic texture results

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