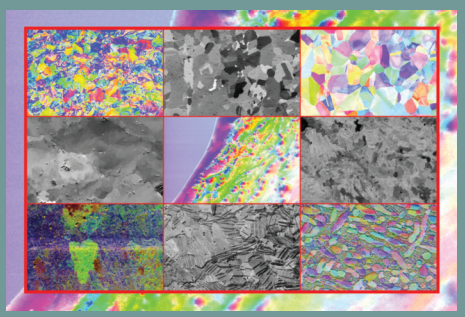
EDAX Smart Insight

AMETEK® MATERIALS ANALYSIS DIVISION

Product Bulletin - EBSD

PRIAS™



- Innovative imaging system for synchronous collection from multi-positional electron detectors
- 25 positional electron detectors
- Removes the need for multiple Forward Scatter Detector diodes
- Simultaneous imaging of orientation, atomic number, and topographical contrast
- Arithmetic processing of images to isolate, enhance, or suppress specific image contrasts or details
- RGB coloring of multiple detector signals for enhanced microstructural visualization

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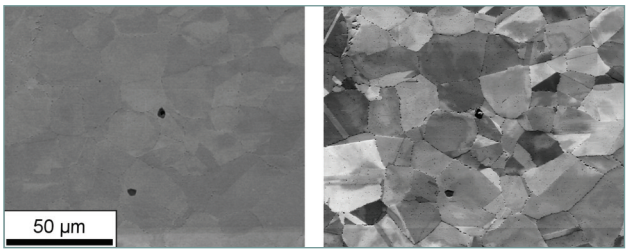
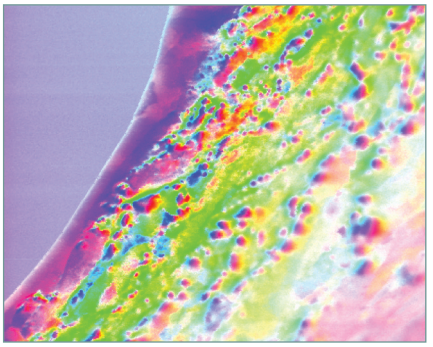
Pattern Region of Interest Analysis System (PRIAS™) is a synergistic new approach for imaging and visualizing the microstructural features of materials. This unique system uses the EBSD detectors both to capture and index EBSD patterns and also as an array of positional electron detectors for sample imaging. By synchronously imaging from up to 25 detector regions of interest (ROIs), multiple images can be generated and displayed simultaneously showing orientation, atomic number, and topographic contrasts. Further arithmetic processing of this array of images allows unprecedented analysis and visualization of material microstructure and the isolation, enhancement, or suppression of specific contrast mechanisms of interest.

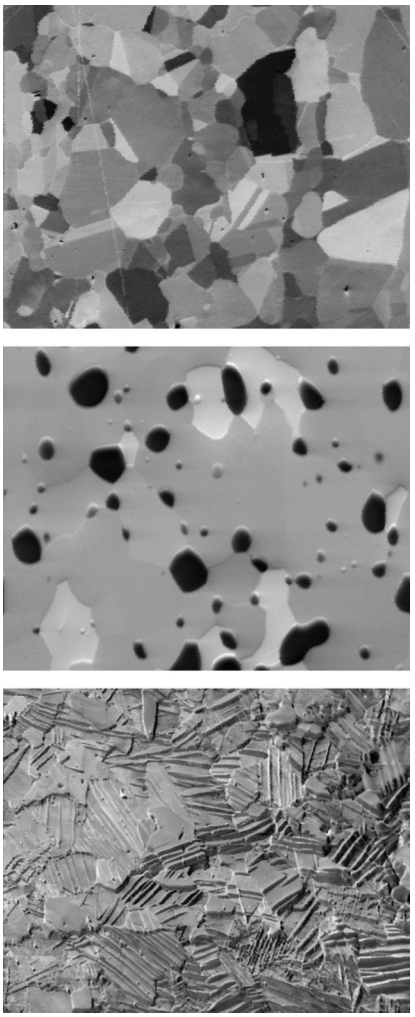


Standard Secondary Electron image (left) and PRIAS™ image (right) showing increased orientation contrast.

Optimal EBSD pattern collection requires a highly tilted sample and a well polished surface, which makes traditional SEM imaging challenging, as Secondary Electron (SE) and Backscattered Electron (BSE) detectors are not optimally positioned for imaging a tilted sample. A Forward Scatter Detector (FSD) system can be used to enhance imaging capability, but either multiple detectors or multiple exposures from a single variably-positioned detector may be necessary to fully utilize the information in the electrons scattered from the sample. These detectors must be placed away from the maximum signal around the perimeter of the EBSD phosphor screen. PRIAS™ removes the need for additional hardware and for pre-selection or positioning of detectors by simultaneously imaging all detectors to capture a set of images with optimal contrast.



RGB colored PRIAS™ image from transmission-EBSD sample of rolled aluminum.



PRIAS™ images showing orientation (top), atomic number (middle), and topographic (bottom) contrasts.

Features and Benefits

Synchronous image collection from all ROI detectors

- Easily and quickly select the optimum image for sample visualization

PRIAS™ Live Mode

- Dedicated mode for fast microstructural imaging
- 25 fixed ROI detectors
- Only available with Hikari EBSD cameras

PRIAS™ Collection Mode

- PRIAS™ imaging data automatically collected simultaneously with TEAM™ EBSD mapping data
- No user input required for collection
- Preset ROIs for orientation, topographic, and atomic number contrast imaging
- Direct correlation with orientation, chemical and phase data

PRIAS™ Analysis Mode

- Imaging generated from saved EBSD patterns
- Fully flexible positioning of ROI detectors
- Direct correlation with orientation, chemical and phase data

Arithmetic Image Processing

- Processing of multiple images simultaneously for maximum information extraction

RGB Image Coloring

- Red, Green or Blue color channels can be assigned to any ROI images
- Creates fast microstructural image in lieu of fully OIM image

Automated Detector and Imaging Setup

- TEAM™ Smart Camera Optimization sets up Hikari EBSD camera for fast PRIAS™ Live imaging
- Save time by not adjusting contrast and brightness for each image manually

Conclusion

The PRIAS™ imaging approach improves the efficiency of the TEAM™ EBSD system by using the EBSD camera as both an EBSD detector and an array of positional electron detectors. This approach provides unprecedented flexibility in microstructural imaging, and enables new insights into today's material analysis. Applications of PRIAS™ include traditional EBSD materials such as metals, ceramics, semiconductors, and minerals, as well as new analysis of plastics and metals.

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