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Advanced EBSD data processing with OIM Analysis - data selection, validation, and quantification

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Abstract

EBSD is a standard tool for material science research. It has become synonymous with nice images such as Image Quality, IPF, grain size, and many other types of maps, charts, and plots which can be easily created in the OIM Analysis™ Software and contain a wealth of information. Such visualisations are very useful to obtain an overall representation of a sample, but in many cases, full-field analyses may also contain averaged properties from different microstructural components that need to be separated. For example, in an analysis of partially recrystallised materials, the orientation distribution of both the deformed and recrystallised fractions will merge, which may hamper the analysis of microstructural evolution. OIM Analysis has powerful routines to generate subsets or partitions from a full dataset that allows for detailed analysis of customisable selections of a dataset (Figure 1).

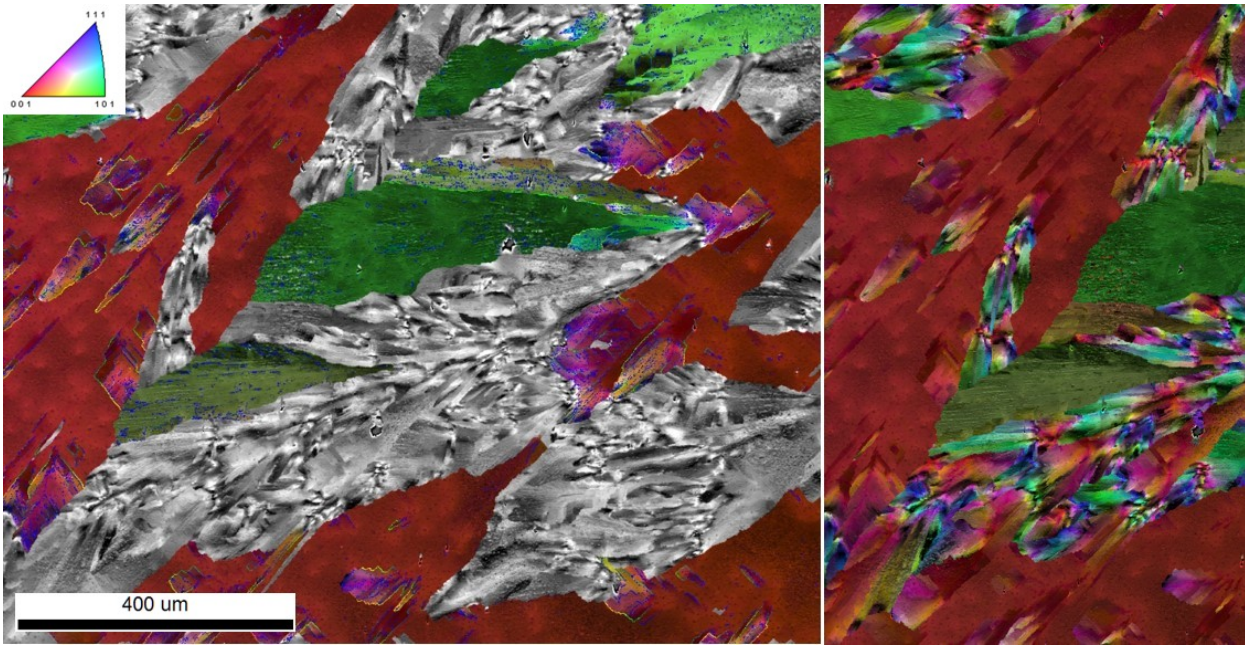

Figure 1: Recrystallised fraction separation in the gold layer in an electronic component.

Another point of attention is the reliability of orientation measurements. The EDAX indexing algorithm

actively verifies if multiple orientations are possible and provides a warning if data points are ambiguous and either need to be corrected or removed.

Beyond all the visualisation and analytical capabilities, all information ranging from raw orientation data to the number of neighbouring grains and texture coefficients can be accessed and exported for further processing. And in the latest version of OIM Analysis, the analytical capabilities have been expanded even more with the implementation of full pattern analysis, dynamic pattern simulations with dictionary indexing, and parent grain reconstruction (Figure 2).

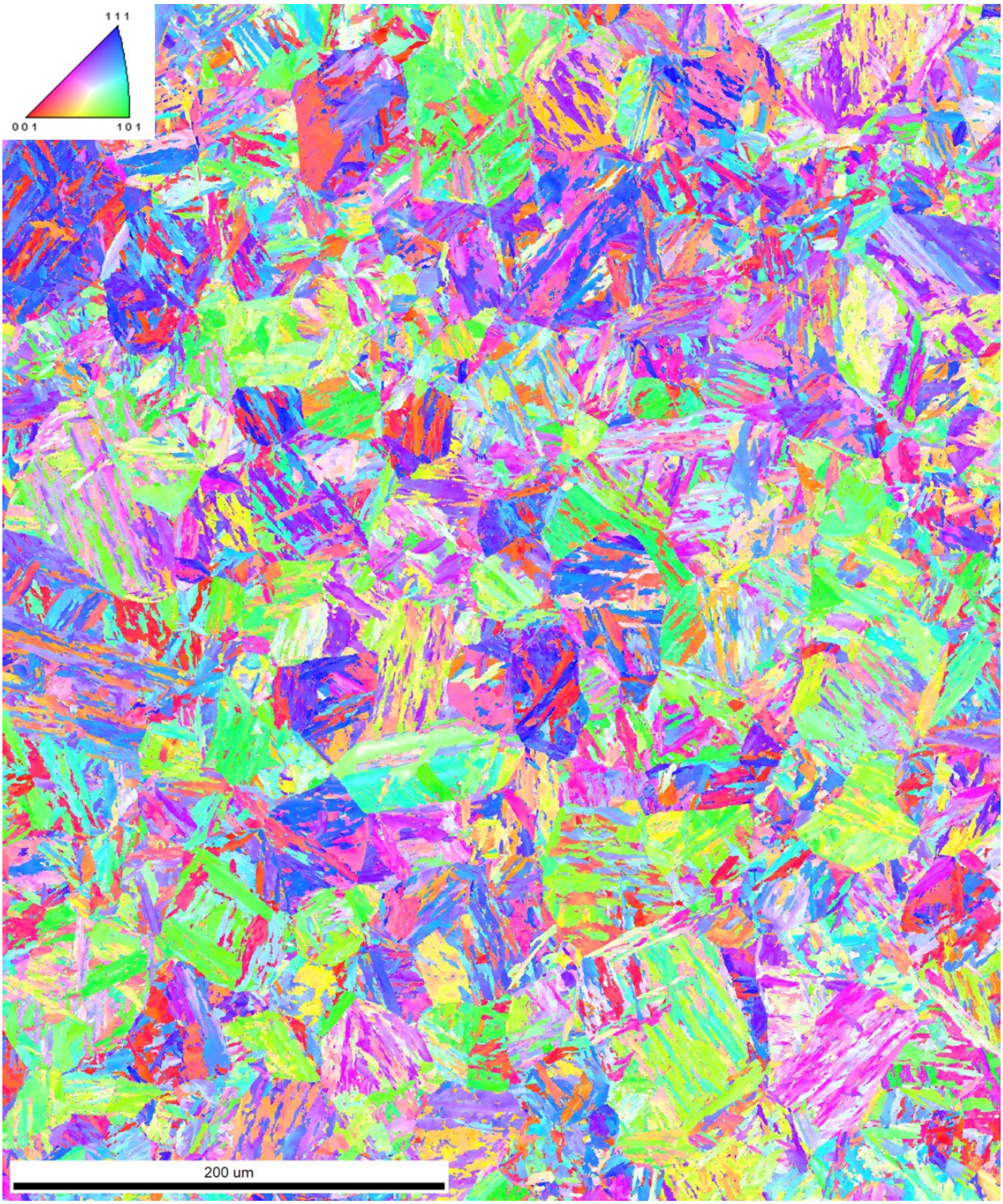
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Figure 2: Reconstruction of original high-temperature austenite microstructure from martensitic measurement.

In this workshop, the capabilities and workflow of the OIM Analysis Software will be presented.