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Tool for Correlating EBSD and AFM Data Arrays

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ABSTRACT

Ceramic and semiconductor research is limited in its ability to create holistic representations of data in concise, easily-accessible file formats or visual data representations. These materials are used in everyday electronics, and optimizing their electrical and physical properties is important for developing more advanced computational technologies. There is a desire to understand how changing the composition of the ceramic alters the shape and structure of the grown crystals. However, few accessible tools exist to generate a dataset with the proper organization to understand correlations between grain orientation and crystallographic orientation. This paper outlines an approach to analyzing the crystal structure using data collected from atomic force microscopy (AFM) and electron backscattered diffraction (EBSD) scans to build an accurate image of the crystal structure and orientation in the ceramic. The following tool takes data from AFM and EBSD scans of the same surface to create an accessible and easily-manipulatable data organization that stores several parameters relating to the crystallographic information of the surface. While this code was tested using on barium strontium titanate, but can of other materials with crystalline surfaces can take advantage of this analysis tool.

KEYWORDS

Crystallography, EBSD, AFM