

# **Application of three dimensional high resolution orientation microscopy for microstructure characterization**

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The aim of the PhD work is to develop a 3D-EBSD technique towards microstructure analysis of fine grained materials. The 3D-EBSD technique enables characterization of microstructure of materials with a grain size in the order of few microns. The method is based on sequential removal of material layers and collection of EBSD maps that are used for determination of crystallographic orientation of particular points of the sample. The focused ion beam used for sputtering contains gallium atoms. All collected maps are stacked together by means of professional, commercially available software and a three dimensional reconstruction of materials microstructure is created. Such picture enables not only analysis of grain size and orientation but also complete characterization of grain boundaries, what was unachievable by means of regular orientation imaging microscopy. Additionally, it enables characterization of pores structures within material. The 3D-EBSD technique will be applied to analyze microstructure of electrodeposited coatings, oxide layers, highly deformed metals and porous ceramics.