CHARACTERIZATION OF BIOACTIVE GLASS S53P4 BY ULTRASOUND MICROSCOPY AND SCANNING WHITE LIGHT INTERFEROMETRY

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Bone replacement materials (BRM) are used in orthopaedic surgery to substitute bone. The implanted BRM is expected to be replaced by new bone growth into and around the material as well as by dissolution of the BRM. Bioactive glass (BAG)-S53P4 is a bone substitute with osteoconductive and osteostimulative properties. In this study, we establish a method based on ultrasound microscopy (USM) and scanning white light microscopy (SWLI) to investigate implanted BAG-S53P4 and subsequent bone formation in a rabbit model. The USM-SWLI method demonstrates ability to differentiate between BAG-S53P4 and bone. We achieved this by co-registering an elasticity-associated image map created by USM and topographical map created by SWLI. For reference, structures identified with USM-SWLI were confirmed by SEM spectrometry. The established method can be used to characterize BRM implants *ex vivo*. This is a first indication that ultrasound may provide future means to follow BRM substitution by bone in a clinical application.

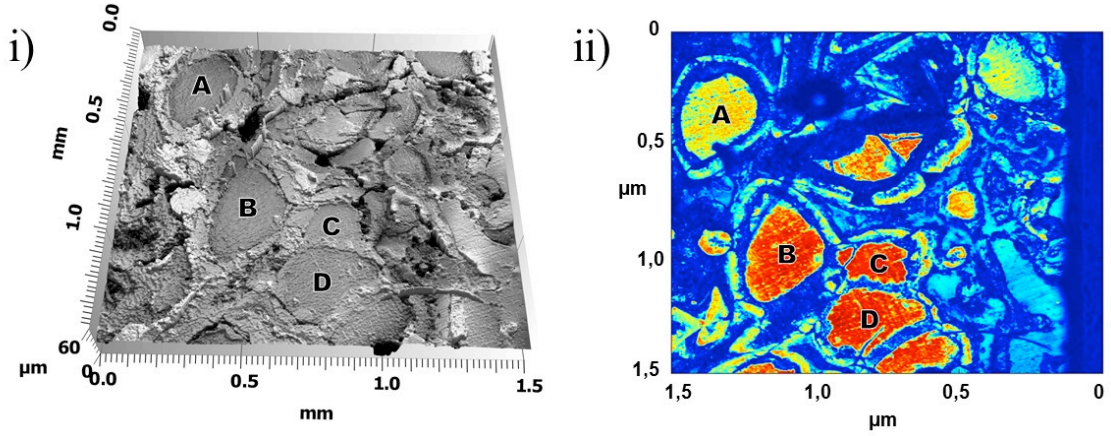

Figure 1. i) topographical SWLI 3D image and ii) USM image taken from same area showing bioactive glass granules (A-D). The dissolution process of the bioactive glass is characterized by a surface active reaction layer, which clearly can be distinguished on USM.