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Phase contrast and X-ray dark field imaging: New possibilities for analyzing tooth re-construction

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Composite materials have been attracting increasing attention as materials for tooth recon-struction. In medical technology the ceramic reinforced polymers offer a wide range of oppor-tunities. Specific advantages of these composite materials are their robustness, properties for biocompatibility which make them so appealing for tooth reconstruction. For tooth recon-struction, however, not only new manufacturing processes but also appropriate non-destructive testing and characterization tools are required. The presentation concentrates on a novel technique that has demonstrated great potential for non-destructive testing (NDT) and non-destructive evaluation (NDE). This method uses the Talbot-Lau grating interferometer principle. It enables X-ray insights extended by two additional contrast mechanisms: X-ray Phase Contrast Imaging (XPCI) and Scatter Dark Field Imaging (SDFI). Conventional radio-graphic systems, based on the absorption of x-rays in the sample, have limited contrast for light materials such as polymersand biological tissues. XPCI, on the other hand, is able to re-veal subtle changes in the microstructure of the samples, such as micro-cracks in composite.

Biography

A Dommann is heading the Department of Materials meet Life at Empa since 2013. He re-ceived his PhD in Solid State Physics in 1988 from ETH, Zurich in Switzerland. His research concentrates on the surface analysis, bio surface interactions, structuring, coating and charac-terization of thin films and MEMS structures. He is a member of different national and inter-national committees and teaches Materials for Medtech, Crystallography and MEMS technol-ogy at different Swiss universities and has published more than 130 papers in the fields of thin films, coatings, MEMS, reliability and material characterization. He is also a member of the Swiss Academy of Engineering Sciences (SATW) and in 2016 he was appointed as Adjunct Professor at the University of Berne.

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