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Synchrotron-Tomography on Complex Material Systems — •A. Rack[1], L. Helfen[1], I. Manke[2], S. Zabler[2], C. Knabe[4], H. Riesemeier[3], M. Stiller[4], J. Goebbels[3], T. Baumbach[1], and J. Banhart[2] — [1]Forschungszentrum Karlsruhe – ANKA — [2]Hahn-Meitner-Institut Berlin, Abteilung Strukturforschung — [3]Bundesanstalt für Materialforschung und -prüfung, Berlin — [4]Charité Berlin

High resolution synchrotron-tomography investigations on metal foams, commercial batteries and novel rapidly resorbable bone substitutes (ceramics like Bioglass, Cerasorb) are reported. The measurements were performed with spatial resolutions between 1 and 5 μm at the synchrotrons ESRF (ID19), BESSY (BAM*line*) and ANKA (TOPO-CT). The use of monochromatic radiation and the application of subsequent 3d image analysis [1] enables us to separate different material phases in the volume data sets, e.g. metal foam matrix and foaming agents or bone tissue and ceramics. Therefore, the pore formation processes in early stages (1% to 10% porosity) of aluminium foams could be studied *ex situ*. Additionally the time and spatial dependence of a commercial (type AAAA) batterie's zinc powder decay was quantified *in situ*. Finally quantitative determination of the formation and structural changes of the bony tissue in a given defect plus the biodegradation of the bone substitute materials within an animal or human biopsy 3, 4 and 6 months after implantation was performed *in vitro*.

[1] J. Ohser and F. Mücklich, *Statistical Analysis of Microstructures in Materials Science*, John Wiley & Sons, 2000

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