MM 44 Symposium Tomographic Methods in Materials Research

Zeit: Dienstag 15:15–16:15 Raum: TU H1058

MM 44.1 Di 15:15 TU H1058

In-situ Synchrotron X-ray Tomography Investigation of Creep Damage — •Anke Rita Pyzalla[1], Bettina Camin[2], Heinz Kaminski[1], Andreas Kottar[1], Andrea Pernack[2], Karolina Zimnik[1], Thomas Buslaps[3], Marco di Michiel[3], Elodie Boller[3], and Walter Reimers[2] — [1]TU Wien, Institute of Material Science and Technology, 1040 Wien, Austria — [2]Institute of Material Sciences and Technologies, 10587 Berlin, Germany — [3]ESRF, 38043 Grenoble, France

Using a novel miniature creep device the development of creep pores, pore agglomeration and crack growth could be investigated in-situ at high temperature for the first time using synchrotron X-ray tomography. The evolution of the pore volume, pore size and their dependency on temperature and creep stress is presented. The results of the experiments further reveal characteristic differences of the damage evolution for materials containing soft and hard second phase particles.

MM 44.2 Di 15:35 TU H1058

Materials analysis by joined microfocus computer tomography (μCT) and 3D Photogrammetry — •Matthias Schulze, Michael Nöthe, Bernd Kieback, and Hans-Gerd Maas — Technische Universität Dresden

The most important drawback in the theoretical description of sintering processes is the lack of a sufficient incorporation of cooperative material transport processes. This results in an inconsistence of the predicted and observed shrinkage behaviour of real sintered specimens. The first method to gain data necessary to develop a theory of cooperative material transport processes is microfocus computer tomography (μCT) joined with 3D photogrammetric image analysing to determine the particles and their motions. With methods based on subvoxel image analysing particles are detected automatically and their surface is modelled with subvoxel precision. To determine the spatial dynamic during the sintering process tracking and matching algorithms are implemented to trace single objects. These data proved the rotation of particles and allowed to determine geometrical and topological features like shape parameter, contact partners and interparticle contact area. These results give hints on the nature of the particle rearrangement and the characteristics of the sintering process. In addition the versatility of 3D photogrammetric image analysis will be shown by means of the development of cracks in concrete.

MM 44.3 Di 15:55 TU H1058

Special features of tomography with cold neutrons — •Nikolay Kardjilov[1], André Hilger[1,2], Ingo Manke[1,3], Markus Strobl[1,2], Wolfgang Treimer[1,2], and John Banhart[1] — [1]Hahn-Meitner-Institut, Glienicker Str. 100, 14109 Berlin — [2]Technische Fachhochschule Berlin, Luxemburger Straße 10, 13353 Berlin — [3]TU-Berlin, Straße der 17 Juni 135, 10623 Berlin

Cold neutrons interact stronger with most materials than thermal neutrons. Therefore the image contrast and the element detection sensitivity in tomography investigations can be improved by using cold neutrons. In contrast to neutron tomography with thermal neutrons, cold neutron tomography has its own specifics which should be taken into account in when processing experimental data. The influence of the Bragg-cut-off , beam hardening and spectral effects lead to a complicated image formation. Typical examples of cold neutron tomography experiments will be discussed and analyzed.