

M05.EE Micro Structure and Texture of Real Materials

Chair: F. Frey

Co-Chair: S. Billinge

Attendance: 91



The microsposium included 5 excellent talks on different kinds of microstructures such as size and grain distributions in crystallites, local defect structures, short-range ordered stripe structures, local textures, residual strains in metal/matrix composites, strain gradients in multilayer systems, cone-like carbon or boron nitride structures forming nanotubes, and microstructures due to plastic deformation. Different systems and compounds and their relationships to material properties were presented, experimental and analytical methods were explained and exciting views on future potentials of methods were given. *V. Massarotti* focused on ceramic oxides, exemplified by defect spinel LiMn_2O_4 structures, the tuning of the material properties by synthesis conditions as analysed from anisotropic peak profiles in x-ray powder patterns. *S. Billinge* showed how to exploit the total scattering pattern towards an understanding of local structures via an analysis of atomic pair distribution functions. The method was exemplified by mixed valence manganites where localized and delocalized phases coexist or cuprates with stripe-like microstructures of different length scales. The power of high-energy synchrotron radiation, e.g., for investigation of phase purity, textures, alignment of grains, etc. in thin Bi-Sr-Ca-Cu-O tapes was impressively outlined by *H. Poulsen*. The perspective view of a 3D x-ray microscope for 3D mapping of crystalline materials exhibiting, for example, local textures, strain gradients or microcracks gave on fascinating outlook for future work. The high potential of synchrotron microbeam lines for microstructural research of plastically deformed materials was demonstrated by *M. Drakopoulos*: „Single crystal analysis“ can be performed on single micron-sized grains in a material. *L. Bourgeois* presented the world of nano-cones, tubes, helices and hats formed by sheets of BN or carbon indicating the close relation between, e.g., ring-like defects and superconductivity. Thus the audience had a fascinating view in the science of nano-materials. Summarizing, the MS was a brilliant session on micro-structures and their intimate relations to material properties.

Fritz Frey