

Topics: Structure of nanocrystalline materials, defects and interfaces in nanostructured metals. Structure of amorphous phases and metallic glasses. Kinetics of phase transformations.

Nanostructured materials and metallic glasses gain increasingly scientific and technical interest due to remarkable materials properties as e.g. enhanced strength and high ductility. Numerous articles published in the last decades focus the processing and properties of free nanoparticles, nanowires, thin films and bulk nanostructured materials as well as amorphous materials and metallic glasses. My research interest focuses on characterization and analysis by electron-microscopic and calorimetric methods. In particular transmission-electron-microscopy (TEM) and differential scanning calorimetry (DSC) as well as low temperature measurements of physical properties are applied. Current research topics are:

- **Defects** in metallic systems play an essential role for the mechanical and thermal stability of nanocrystalline materials. Present research focuses their formation and structure to gain knowledge on the underlying physical mechanisms.
- **Interfaces** are crucial for any physical properties of nanostructure materials since a large interface area is present. Characterization of their structure down to the atomistic level and correlation of occurring size effects is carried out. The melting of nanoparticles embedded in a coarse grained matrix, as well as the martensitic transformation can be significantly influenced by interface effects.
- **Amorphous materials** as processed by severe plastic deformation (SPD) and by rapid quenching (as e.g. metallic glasses) are analyzed concerning their structure, their thermal stability and the deformation behaviour.
- **Kinetics** of crystallization, recrystallization and grain growth are of interest. As a goal, tailoring of the achieved microstructure after crystallization does facilitate the analysis of grain size dependent phenomena.
- **Collaborations** in the topic of analytical TEM work on the structure of amorphous materials exist with the EMAT Antwerp (Prof. Dr. D. Schryvers) and the University of Vienna (Prof. Mag. Dr. T. Waitz, Dipl.-Ing. Mag. Dr. C. Gammer). Moreover collaboration on size-effects in nanostructured NiTi shape-memory alloys is carried out with the University of Vienna.