



TRR 80 Seminar

Am Dienstag, den 16. November um 16:00 Uhr

spricht

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über das Thema

Advanced TEM Methods: Going beyond Imaging

The microstructure often determines electronic, optical and mechanical properties of materials. The grain size as well as the type of phases present and their spatial distribution are playing an important role. Furthermore, two-dimensional defects such as grain boundaries and interfaces often control the resulting materials properties since they act as dislocation obstacles or, if the interfacial bonding is weak, can result in failure of e.g. electronic packaging systems. Therefore, it is important to investigate the microstructure down to the atomic scale, which can be done by combining advanced transmission electron microscopy (TEM) techniques.

High-resolution TEM (HRTEM) and so called Z-contrast images (Z stands for the atomic number) using a scanning TEM (STEM) allow to study the atomic structure of interfaces or the crystal structure of nm-sized precipitates. Dynamic processes which might occur at interfaces at elevated temperatures can be investigated on an atomic scale by in-situ TEM experiments. Analytical TEM measurements such as energy dispersive X-ray spectroscopy (EDX) and electron energy-loss spectroscopy (EELS) allow to determine the chemical composition of individual phases in nanocomposites or to study e.g. segregation phenomena at interfaces. In addition to the chemical composition, EELS measurements can also be used to get insight into the electronic structure. This is obtained by analyzing the electron energy-loss near-edge structure (ELNES) which is associated with each element specific ionization edge and which contains information on e.g. bonding characteristics and nominal oxidation states of the probed atoms.

In the talk different examples will be presented where these advanced TEM techniques are applied to study nanocomposites and interfaces.

Gäste sind herzlich willkommen!

Der Vortrag findet im Seminarraum 288/Physik-Süd, Universität Augsburg statt.

Gastgeber: Dr. Andreas Schmehl

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