



Presentation Summary

The presentation 'From Micro to Nano - Advanced Microscopy Methods and Techniques in Material Research' presents the activities of the Centre for Electron Microscopy for Materials Engineering at AGH University (C-EM AGH). It presents the results of microstructural research on structural materials using modern electron microscopy techniques and methods.

The Centre's research team focuses on the application of new electron microscopy methods and techniques, including FIB-SEM tomography, for the quantitative evaluation of micro- and nanostructure elements of innovative engineering materials. The Centre is developing various methods for nanoscale phase identification, such as STEM-EDS chemical composition mapping, EFTEM, PED and FIB-SEM tomography. In situ studies of nanophases and phase transformations in nanomaterials are also being conducted.

The research team has made significant progress in the comprehensive quantitative characterization of the micro- and nanostructure of modern materials at the micro-, meso- and nanoscale. The AGH Microscopy Centre focuses on materials for conventional power plants, aircraft engines and stationary gas turbines, power plants operating under advanced ultra-supercritical conditions, coatings for improved oxidation resistance, high-temperature ODS steels, tungsten alloys for fusion reactors, complex intermetallic phases and nanomaterials.

The C-EM at AGH also uses microscopic methods in the 3D analysis of cell responses to scaffolds made of polymer nanofibers for bone tissue regeneration. The research team is also investigating MG-63 cell lines incubated on the surface of ceramic materials.