

Introduction to the Course and to Analytical Microscopy

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Abstract

Materials Science is evolving towards a refined tailoring of microstructures in order to meet increasingly complex requirements, be it for their mechanical, electrical, magnetic, corrosion properties (to name a few). So-called "Intelligent"; "smart" "active" materials are at the heart of such active developments. Their properties however must inevitably be tracked down to the atomic scale.

The need for a precise chemical and structural analysis at widely different length scales has thus tremendously increased. New instrumental developments in the past years, like aberration corrected transmission microscopy, high throughput chemical analysis based on X-ray or electron energy loss spectroscopy, laser assisted atom probe tomography, nanometric secondary ions mass spectrometry to name a few, nicely match those increasingly demanding requirements for analysis.

The aim of this school is to provide you with the basics of selected methods, given by specialists in the field.

I will briefly introduce the methods that will be covered in this school, with an emphasis on the key parameters like resolution, accuracy, detection limit etc. that characterize and differentiate them, and show how they complement each other.

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