

# 東北大学大学院歯学研究科 インターフェイス口腔健康科学 第99回学術フォーラム

*Forum for Interface Oral Health Science*

## Investigation of nanostructural materials by means of X-ray powder diffraction

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歯学研究科大会議室（C棟1階）

The Facility for X-ray Diffraction of the University of Duisburg-Essen will be presenting the different possibilities of measurements with various examples in powder X-Ray diffraction (PXRD), especially for the investigation of nanostructural materials. In the introductory lecture, some aspects of crystallography and X-ray diffraction will be given, such as the history of X-rays, radiation protection, and work principles of the X-Ray device (diffractometer). Also, the information content of powder diffractograms and the Rietveld-method, with related mathematical background, will be discussed. There are some common techniques used for the investigation of nanostructured materials, e.g. light scattering (DLS and NTA), scanning and transmission electron microscopy (SEM and TEM), fluorescence and IR spectroscopy. X-ray powder diffraction (PXRD) with different geometrical setups is a complementary non-destructive technique for the determination of crystallographic and size-related properties of nanostructured materials. Here, some examples of PXRD measurements in different applications with the use of Rietveld analysis, including size-specific data obtained from colloid-chemical analysis, transmission and scanning electron microscopy will be presented. Several scientific questions will be addressed, like:

- How can crystallite size, residual stress and texture be determined for nanostructured materials?
  - How is it possible to investigate a thin coating of nanomaterials?
  - Which advantages does a characterization of samples in temperature chamber offer?
- All of these scientific problems can be solved by the use of X-ray diffractometers in different geometries, working on the devices Bruker D8 \*Advance\* and Panalytical \*Empyrean\*.

連絡先: 第99回モデレーター

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