

Faculty of Mathematics and Natural Sciences

Department of Geography

Geography of Soils and Quaternary Morphology

Expertise

Prof. Schröder's and his team's research is focused on the non-destructive method of x-ray powder diffractometry to identify and characterise minerals. Subsequently, the powder samples can be analysed by other methods. The method of x-ray powder diffractometry and its content is closely related to the field of mineralogy and crystallography. Therefore, the method is used in materials research and building materials science. The team is working towards an implementation of the method in continuing and adult education, teaching and learning approaches. Materials suitable for x-ray powder diffractometry: Building materials, concrete, mortar, cement, fine and heavy ceramics, rocks, ores, sediments, ash, dust, filter and combustion residues. Potential fields of applications are: Clay mineralogical investigations (soil science - agriculture), archaeometric investigations (ancient colours and paints, bronze patina and archaeological ceramics), identification of unknown crystalline substances (fingerprinting), identification of crystalline phases, qualitative and semi-quantitative analyses of mixtures, isomorphisms, polymorphisms, determination of amorphous and crystalline states as well as state of crystallisation and particle sizes. The analysis is conducted with powder on a matrix < 32 µm and with texture specimen on a matrix < 2 µm.

Scientific Services

- diffractometer "XRD 3003 Theta/Theta" (by Seifert) with the copper anode, qualitative mineral analysis and semi-quantitative phase analysis using the Rietveld-method
- full qualitative mineral analysis and semi-quantitative phase identification using the Rietveld method
- spectrometer "iCAP 6000" (by Thermo Scientific)
- multi-element analysis
- element determination using the ICP-OES acc. to DIN 38406-22
- determination of the ignition loss
- measuring of the pH value, the carbonate level, determination of iron soluble in oxalate solution and water content acc. to DIN 19683-4 in the soil
- determination of the exchange capacity of the soil and replaceable cations acc. to DIN 19684-8
- determination the composition of grain sizes by sieving acc. to DIN 19683-1, preparation with pyrophosphate of soda acc. to DIN 19683-1 and by laser diffraction



Topics / Trends

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Urbanisation & Mega Cities
Water
Continuing Education / Lifelong Learning

Industries

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Energy, Utilities & Raw Materials