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Advanced Oxidation for Use-Oriented Water Treatment. Oxidation reactions are well suited for the degradation and elimination of water pollutants. To serve the world wide demand for clean and healthy water, these reactions must be fast, effective and reliable. In addition, minimised by-product and waste formation has to be given. The use of catalysis and the formation of OH radicals as reactive species is promising. Theirapplication in water treatment for specific reactions has to be investigated (kinetics, identification and characterisation of metabolites etc.).
Trace Analysis. Emerging aquatic pollutants like pharmaceuticals, personal care products ornanoparticles need to be identified and quantified by advanced chromatographic and spectrometric methods. The distribution, transport and fate of the pollutants in the environment have to be investigated to reach a meaningful assessment of the actual situation in rural and municipal systems including mega cities.
Membrane Processes. Membrane filtration has found its way into tailoring water quality. Fouling processes are major pitfalls of this promising technology. Therefore fouling has to be investigated systematically for different membrane types and water qualities. Regeneration processes and specific running conditions have to be examined with respect to operation results. Methods like REM, TEM, AFM, EXAFS, MAS-NMR etc. will be used.

2. **Prof. Hermann Nirschl, Dr. Harald Anlauf, Dipl.-Ing. Alexander Gutsche**
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Research: Synthesis and Characterization of Specific Sol-Gel Silica Nanoparticles by Means of Small Angle X-Ray Scattering and Gas Sorption Analysis
The goal of the proposed experimental work is to find out the proper reaction conditions in a sol-gel synthesis needed to achieve silica nanoparticles with specific properties, such as narrow particle size distributions and pores in the size range from 0.5 nm to 5 nm. For this purpose a SAXS laboratory camera, a gas sorption instrument, TEM, SEM and other measurement techniques are available at the institute which serve to gain an understanding of the particle formation and growth mechanisms.

3. Prof. Dr.-Ing. Wilhelm Schabel, Dr.- Ing. Philip Scharfer
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The main research areas can be summarized as:

- Functional Films and Materials, Biosensors, Coatings
- Organic & Printed Electronics Fundamental Research and Process Technology
- Li-Ion Battery Research and Process Technology
- Coating & Drying Technology and Processing of Thin Films
- Heat and Mass Transfer of Imginging Air Flows
- Diffusion in Polymeric Systems

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Research: Characterisation and modelling of high-temperature reactions in combustion chambers and online-control

Biomass pyrolysis

High-temperature reactions

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Research: Synthesis of biological relevant complex structures and nanostructures
Targets
Synthesis of natural products (Mycotoxins) and other bioactive molecules
Biological relevant structures (antibiotics, cytostatics, toxins)
Crop protection (herbicides, insecticides, fungicides)
Molecular transporters (peptides, peptoids, polyamines)
Nanostructures
Chemical biology of cell recognition
Methods
Combinatorial chemistry (solid-phase synthesis, automated synthesis)
Asymmetric synthesis (metal- and organocatalysis, chiral ligands)
Organometallic synthesis (transitionmetal catalyzed processes)
Metal Complexes