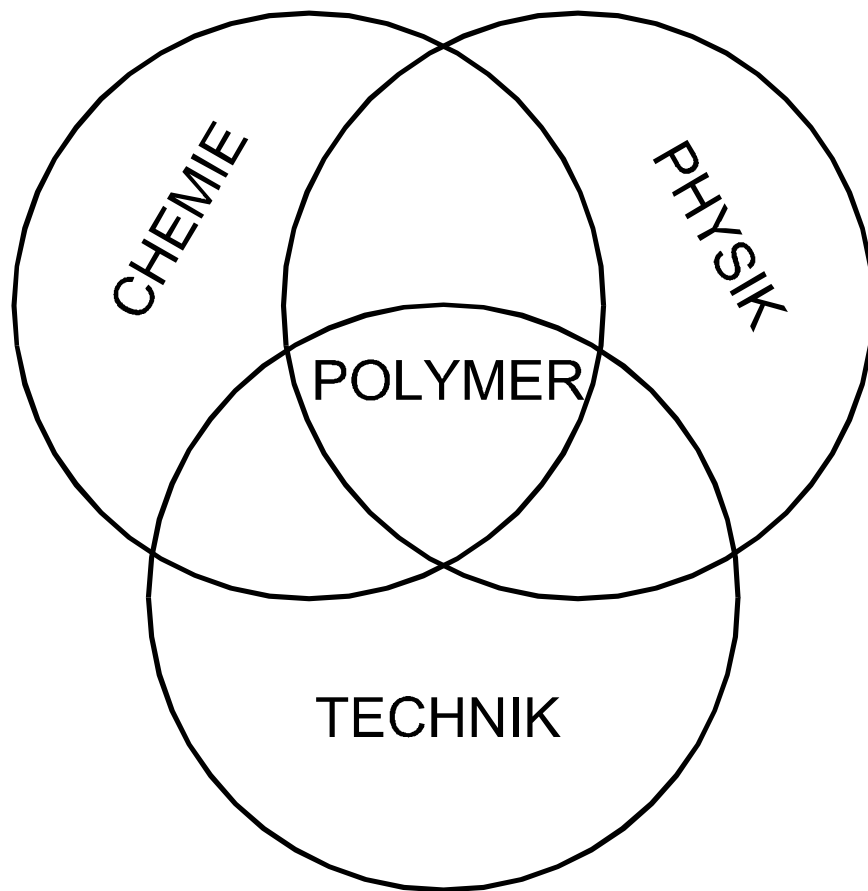


**Berlin-Brandenburgischer Verband
für Polymerforschung e.V.**



Scientific Report

Bericht über die wissenschaftlichen Aktivitäten

2005

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Preface

The 19th Annual Report of the BVP arrives in the familiar design which keeps the cost within reasonable limits and allows for rather comprehensive information. In order to accommodate our foreign partners, this source of information about the polymer research scene in Berlin and the surrounding region of Brandenburg is published mainly in English. In order to avoid confusion, the names of the participating institutions are given in German only.

The report may also be found on the home page of the BVP (see next page).

The main purpose of the report is a comprehensive overview of the scientific activities of the BVP members and their graduate and undergraduate students.

The BVP welcomes its new regular members Anna Köhler, Institute of Physics at the University of Potsdam, and Rainer Haag, Institute of Organic Chemistry and Biochemistry at the Free University of Berlin.

The former regular members Ludwig Brehmer, University of Potsdam, and Werner Jaeger, Fraunhofer Institute for Applied Polymer Research, have been retired.

The BVP welcomes Barbara Sandner who has agreed to become a corresponding member of the BVP.

We hope that this report will find your interest. Please feel free to contact the BVP and its members with any comments, and in particular with enquiries about this report and with proposals for joint research activities.

Reimund Gerhard-Multhaupt, University of Potsdam

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<http://pmm08.physik.hu-berlin.de/bvp/bvphome.htm>

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Research Interests of the Regular BVP Members

Prof. Dr. Markus Antonietti

Max-Planck-Institut für Kolloid- und Grenzflächenforschung

The scientific work covers different aspects within the area of the synthesis, structure and characterisation of colloids and polymers. A rough division in four topics can be made:

Polyelectrolytes

Investigations of model systems: Static and dynamic light scattering, rheology; PE mixtures; alternative PE-architectures; Polyelectrolyte-surfactant complexes

Heterophase polymerization

Micro-, mini-, and (macro) emulsion polymerization, inverse precipitation polymerizations; complex surface functionalization of latexes; hierarchical structures from latexes, polymer dispersions as drug carriers and diagnostics

Amphiphilic polymers

surface stabilization, micellation, stabilization of metal and semiconductor colloids, new synthetic routes amphiphilic block copolymers, double hydrophilic blocks and crystallization control

Colloidal superstructures

Aggregation of different colloid types, structure analysis of colloidal superstructures by means of light scattering, X-ray diffraction and electron microscopy, hierarchical materials

Dr. Ulrich Buller

Fraunhofer-Institut für Angewandte Polymerforschung

The research and development of the Fraunhofer Institute for Applied Polymer Research is divided into 5 research divisions:

Research division 1 “Natural polymers” (see research areas Dr. Hans-Peter Fink)

Research division 2 “Functional Polymer Systems” (Dr. Ulrich Buller)

The research division “Functional Polymer Systems” works in the following fields:

Physically active polymers

The department deals with the preparation, characterization and application of functional polymer systems. We improve sensor and transducer properties in new polymer electrets to detect pressure distribution, vibrations and radiation. New dye doped polymer systems can be used as spectral converters, in laser technology, as fluorescence sensors and as light - activated biocidal coatings.

Organic light-emitting diodes and displays, organic field effect transistors

The development of low-content displays with polymer materials is carried out in this group. The group offers a complete range of research and development services from synthesis of new polymer materials to the construction of prototype devices combining a state-of-the-art equipment and a comprehensive know-how. This is a strategy to identify ways from the research to an industrial application. An additional field is the construction of organic field effect transistors with new materials for a polymer electronic.

Modification and Characterization of Surfaces

The group „Surfaces“ modifies chemical and physical properties of polymer surfaces, prepares thin organic functional layers and analyzes the surfaces and thin layers. Various plasma processes and VUV photochemical processes as well as gas phase and liquid phase reactions of the surfaces are used for surface modification on equipment ranging from the laboratory scale up to the pilot scale.

Anisotropic Optical Materials

Research topic of the group is the development of new anisotropic self-organizing materials with complex optical functions. The research covers the synthesis and investigation of various thermotropic calamitic and discotic liquid crystals and lyotropic mesogens. Main applications are anisotropic light modulating optical components for display and information technology.

Photochemistry in Polymers

The basic and applied research in photochemistry and optics is aimed to contribute to the development of optical technologies based on polymers. The research is focused on the development of photosensitive materials, their photochemical processing and the creation of optical elements. Topics are photochemistry in polymers and supramolecular assemblies, especially photochemistry and spectroscopy with polarized light, and holography.

The research on molecular photoreactions, light-induced orientation and diffusion processes in polymers create a reliable basis for the photochemical manipulation of polymers, polymer surfaces and supramolecular systems. Different effects starting from molecular ordering to microstructuring volume films and surfaces of polymer films were realized by means of photochemistry and holography. The developed technologies based on the studied materials and processes have applications in optical data storage, photoalignment of liquid crystals, fabrication of anisotropic films of functional materials, the creation of various optical elements, such as polarizer, retarder, filter, diffuser, diffraction grating, or photonic crystals.

Chromogenic polymers

The department chromogenic polymers develops novel polymeric systems whose optical properties are controllable by external stimuli like temperature, electric field, pressure and light. Hereby, transparency and/or color of foils, plastics, gels and liquid crystals can be adjusted according to the requirements of specific applications.

Research division 3 “Synthesis and Polymer Technology” (see Dr. Gerald Rafler)

Research division 4 “Water-born Polymer Systems” (see Prof. André Laschewsky)

Research Division 5 „Fraunhofer pilot-plant-center for polymersynthesis and processing“ (responsible Dr. Mathias Hahn and Prof. Dr. Michael Bartke)

The Fraunhofer Pilot Plant Center is situated in the Dow ValuePark in Schkopau in Sachsen-Anhalt. Based on the current market profiles of the polymer industry in the Central German Chemistry triangle, the Fraunhofer Pilot Plant Center orientates on product lines like synthetic rubber with subsequent products, polyolefines, olefin vinylacetate copolymeres, PVC, polyester and polyamide concerning the basic technical equipment.

- Development/Adaption of polymer systems on a laboratory scale
- Determination of thermodynamical and kinetical parameters of polymer syntheses
- Technical transfer of laboratory syntheses to Pilot Plant (up to 500l reactor capacity)
- Physically-chemical characterization of polymers
- Contract synthesis: Production of small-scale and test charges
- Optimization of reaction engineering up to reactor geometry
- Determination of rheological properties of polymers, polymer blends and batch material reinforced polymer systems
- Simulation of manufacturing processes
- Assessment of the influence of batch materials on mechanical and chemical properties of composites
- Determination of deformation and failure behavior and thus relevant parameters
- Testing/Optimization of compounding and manufacturing processes
- Characterization of short-term and long-term performance of materials and components under statical and dynamical stress
- Feedback of component properties to requirements of basis polymers – discussion of possible alternative plastics

Prof. Dr. Gerhard H. Findenegg

**Technische Universität Berlin, Institut für Chemie
Physical Chemistry of Colloids and Interfaces**

We are studying the structure, dynamics and thermophysical properties of *complex liquids* (aqueous and nonaqueous systems of amphiphilic block copolymers, surfactants and polyelectrolytes) in their unconfined state (bulk systems), at interfaces, and in thin films. We are also interested in the role of block copolymers and surfactants as structure-directing agents to produce mesoscopically ordered inorganic-organic composites, and we study the structure and phase behavior of pure substances and mixtures confined in nanopores.

Polymer and surfactant systems

The structure and dynamics of micellar aggregates of block copolymers and surfactants in solution and lyotropic phases is studied by scattering techniques (SLS, DLS, SAXS, SANS and NSE spectroscopy). The results are correlated with the macroscopic properties of these systems (with T. Hellweg).

Adsorption layers and surface aggregates of amphiphilic molecules adsorbed at the free surface of aqueous solutions and at solid/liquid interfaces are investigated by X-ray and neutron reflectometry (XR and NR), and grazing-incidence small-angle scattering (GISANS). The interface of water against hydrophobic polymer surfaces and the formation of nanobubbles at such interfaces is studied by NR, GISANS and atomic force microscopy (with R. Steitz).

The structure of polyelectrolyte multilayers and the effect of polyelectrolytes on thin soap films is studied by a combination of different techniques (with R. v. Klitzing).

Confinement effects in nanopores

Periodic mesoporous silica materials with hexagonally ordered arrays of cylindrical pores of uniform size (MCM-41 and SBA-15) are synthesized, using surfactant and block copolymer micelles as templates. Chemical functionalization of the pore walls allows to modify the nature and strength of fluid-wall interactions. These materials are used to study the effect of confinement on the phase behaviour and the structure of pure substances and binary mixtures in the pores:

- Freezing and melting of water and organic substances (DSC); pore condensation of vapours (gravimetric and volumetric adsorption studies in a wide temperature and pressure range; WAXS and in-situ SAXS).
- Adsorption and surface aggregation of surfactants (flow adsorption calorimetry), and structural studies by SANS.
- Self-assembly of metallo-supramolecular coordination polyelectrolytes in cylindrical pores
- Microphase separation of liquid mixtures in mesoporous solids (SANS, NSE).

Further information: http://www.tu-berlin.de/~insi/ag_findenegg/ or
<http://www.tu-berlin.de/~sfb448/>

Dr. habil. Hans-Peter Fink

**Fraunhofer-Institut für Angewandte Polymerforschung
Natural Polymer Division**

The research work of the division is centred on cellulose and starch as the most abundant natural polymers. Investigations are performed in a wide range covering the extraction of the raw materials, characterization and modifications, the industrial conversion, as well as the development of new processing routes and products. R&D projects are dealing with environmentally friendly routes for man-made cellulosic fibres and films, specialty chemicals based on cellulose and starch, the development of cellulose fibre reinforced composites, as well as non-food starch products. As a highlight-example, based on the lyocell-technology, a pollution free processing route for cellulose blown films similar to polyolefin films has been developed recently. Applied research is complemented by basic investigations with regard to the structure formation of bacterial cellulose, the regioselective derivatization of polysaccharides, and the structure of these biopolymers in solution, among others. These investigations as well as solid state structure and property relationships are helpful in finding out capabilities and limitations of the natural polymers.

There are several laboratories and large scale equipments for chemical modifications, a wet spinning laboratory for viscose and cellulose carbamate, a mini pilot plant for the processing of cellulose according to the lyocell technology, extruders, an accredited materials testing lab, several analytical methods including rheology and thermoanalysis, as well as comprehensive methods for solid state characterization (electron microscopy, X-ray scattering, NMR- spectroscopy, among others).

The range of current R&D work with regard to cellulose only may be demonstrated by the following projects:

- new cellulose derivatives
- microcarriers
- hemicelluloses
- bacterial cellulose
- natural fibre reinforced materials
- new commodity materials
- food casing processing routes
- cellulose carbamate fibre technology
- structure-property relationships of fibres, films, and composites

More detailed information regarding the Natural Polymer Division are available at the home page

<http://www.iap.fraunhofer.de>

Dir. & Prof. Dr. habil. Jörg Florian Friedrich

**Bundesanstalt für Materialforschung und -prüfung
Division VI.5: Polymer Surfaces**

Main research

- Plasma technology and polymers
- Polymer surface functionalization
- Polymer surface characterization

- Modification and investigation of interfaces in polymer composites
- Modelling of adhesion

- Production of carbon nanomaterials
- Modification of nanomaterials
- Production of polymer-nanocomposites

- Permeation
- Formation of permeation barriers
- Modification of membranes

Prof. Dr. Reimund Gerhard-Multhaupt

**Universität Potsdam, Institut für Physik
Applied Condensed-Matter Physics**

Main research area

Quasi-permanent charge storage and dipole orientation in homogeneous and heterogeneous polymer electrets mainly for transducer applications:

- Preparation of uniform, voided, or oriented films of highly insulating polar or non-polar polymers by means of spin coating, solution casting, hot pressing, high-temperature stretching, sandwich fusing, etc. plus vacuum deposition of metal electrodes if required
- Global or patterned electric charging or poling of dielectric polymer films by means of biased electrodes, corona or plasma discharges, electron beams, etc. at various temperatures
- Thermal (pyroelectrical) and acoustical (piezoelectrical) probing of electric field, charge or polarisation profiles in all three dimensions of polymer-electret films, for example by means of thermal-pulse tomography
- Dielectric spectroscopy over large temperature and frequency ranges including piezoelectric resonance measurements as well as thermally stimulated or isothermal discharge or depolarisation experiments
- Investigation of dipole orientation, ferroelectricity (switching, hysteresis, etc.), quasi-static and dynamic pyroelectricity, direct and inverse piezoelectricity in polymer-electret films
- Investigation of charge storage and transport and their molecular mechanisms in dielectric polymers, in particular at high electric fields, by means of electrical and optical methods
- Demonstration and assessment of applications-relevant electro-mechanical, mechano-electrical, and thermo-electrical transducer properties of novel or modified polymer electrets

Other research topics

Nonlinear optical properties of electrically poled polymers including electro-optical effects and optical second-harmonic generation

Viscoelastic spatial light modulators without or with reflective metal electrodes for applications in optical information processing and light-valve projection of high-resolution images

Physics of musical instruments, in particular materials- and geometry-related vibration behaviour of historic and modern organ pipes

Homepage: <http://canopus.physik.uni-potsdam.de/>

Prof. Dr. Rainer Haag

**Freie Universität Berlin
Institut für Organische Chemie und Biochemie**

Research Area: Organic and Macromolecular Chemistry

The Haag group is interested in the interface between chemistry, material science, and medicine. Current research topics include dendritic polymers as high-loading supports for organic synthesis and catalysis, intelligent nanotransporters for FNA and drug delivery, multivalent drug conjugates, dendritic polymer architectures as functional mimics of biomacromolecules, and protein resistant nanolayers.

While the immobilized catalysis involves optimization of new polymeric support materials and their use in membrane reactors, the other topics deal with the interaction of functional macromolecules with biological systems. For the training of advanced school children we are also involved in school projects for polymer applications in everyday life, i.e., a “giant soap bubble” project.

The group is well equipped with a number of modern techniques for efficient synthesis and analysis such as parallel synthesizers, ultrafiltration, size exclusion, HPLC, UV, IR, CD, FL, ITC, polarization microscopy, and light scattering. Further relevant infrastructure (NMR, MS, TEM, AFM) is provided by the department.

For further information and related literature see

<http://www.polytree.de>

Prof. Dr. Andreas Hampe

**Bundesanstalt für Materialforschung und -prüfung
Department VI "Function of Polymers"**

Field of research: Mechanical properties of composite materials

The department consists of the divisions

VI.1 "Durability of Polymeric Materials"

VI.2 "Mechanics of Polymers and Composites"

VI.3 "Analysis and Structure of Polymers"

The divisions VI.1 and VI.3 are headed by Prof. W. Mielke and Prof. J. Friedrich, both also members of the BVP. The research activities of these divisions are described on their pages of this booklet.

In the division VI.2, which is headed by Dr. Ch. Marotzke, the mechanical properties of Polymers and composite materials are investigated with a special focus on the micro mechanics. The aim of the research is a better understanding of the behaviour of composite materials under mechanical loads and the identification of the dominating failure mechanism. For the detection of micro damages sound emission measurements and measurements of inner surfaces using a X-ray refraction technique are performed.

Further details on the projects and the research equipment can be found in the internet:

<http://www.bam.de>

Prof. Dr. Manfred Hennecke

**Bundesanstalt für Materialforschung und -prüfung (BAM)
President of BAM**

In the Federal Institute for Materials Research and Testing (guideline: safety and reliability in chemical and materials technologies), projects in polymer science are mainly carried out in the polymer-orientated departments (see reports of A. Hampe, W. Mielke, and J. Friedrich).

In special areas, applied research and testing in polymer science and technology is done by other departments of BAM, e.g.: polymers in the building trade (M. Maultzsch, BAM VII.0), microbiological degradation of polymers (M. Pantke, BAM IV.1), analysis of polymer surfaces (W. Unger, BAM VIII.23), non-destructive testing of polymers and compound materials (M. Hentschel, BAM VIII.32), use of polymers for the packaging of dangerous goods (BAM III.1, III.2), polymers in the technology of landfills (W. Müller, BAM IV.3), polymer optical fibres (W. Daum, BAM S.1).

For further information please visit the Web site of BAM:

<http://www.bam.de>

In cooperation with the department "Function of Polymers" of BAM, M. Hennecke is personally engaged in the development and application of luminescence and other spectroscopic technics for the characterisation of polymers, e.g. with respect to molecular orientation, photooxidation, degradation and crosslinking.

Prof. Dr. Siegfried Hess

**Technische Universität Berlin
Theoretical Physics**

This group, which is part of the Institute of Theoretical Physics at the TUB, treats problems in statistical physics in order to explain physical phenomena of the various kind. The work focuses on the calculation of equilibrium and nonequilibrium properties of liquid and solid materials. Simple and complex substances are considered, such as liquid crystals, colloidal solutions, dilute polymer solutions and polymer melts. Apart from conventional approaches of theoretical physics also numerical methods, such as molecular dynamics (MD), nonequilibrium molecular dynamics (NEMD), smooth particle dynamics Monte Carlo computer simulation are employed. The goal is to determine macroscopic properties based on microscopic models.

The theoretical investigations on polymeric materials in the dilute, molten and glassy states are centered around the analysis of the interrelation between rheological properties on the one hand, and structural and conformational changes of macromolecules on the other hand. The simulations also provide data which can be directly compared with experimental input obtained from flow birefringence, light and neutron scattering measurements.

Website for further information:

<http://www.itp.physik.tu-berlin.de/hess/>

Prof. Dr. Georg Hinrichsen
(retired)

Technische Universität Berlin
Fachgebiet Polymerphysik

The research activities of the Fachgebiet Polymerphysik are concerned with the description and characterization of polymeric materials using various physical methods of investigation. Main object is the understanding of the interrelations between macroscopic (physical and technical) properties and the morphological (microscopic and sub-microscopic) structure of these materials.

The research projects can be summarized in the four complexes of themes:

Oriented semi-crystalline Polymers (Dr. H. Springer)

Observation of structure and orientation distribution of uniaxially or biaxially stretched polyamide, polyethylene terephthalate and LLD-polyethylene films by WAXS, SAXS, light scattering, DSC, thermal-mechanical analysis, IR-spectroscopy, polarized fluorescence spectroscopy, dielectric relaxation spectroscopy and optical birefringence.

Fibre-reinforced polymeric composites

Production and characterization of fibre-reinforced polymers with unique properties: Carbon fibre/carbon composites; aramid fibre/polyamide composites; natural fibre reinforced polymers; biocomposites.

Development of production technologies of fibre reinforced composites: Aqueous dispersion impregnation process; dry powder impregnation process.

Polymeric nanofilms

Design of a laboratory equipment and process for the continuous production of polymeric nanofilms with 20-100 nm thickness. Characterization of the produced films and check on their applicability in membrane and sensor technology.

High-temperature superconducting films (Dr. I. von Lampe)

Production and characterization of HTSC films and coatings using polymer metal precursors (polymethylmethacrylate, polyacrylic acid, novolac).

Internet information

<http://tu-berlin.de/fb6/polymerphysik>

Prof. Dr. Joachim Koetz

**Universität Potsdam, Institut für Chemie
Colloid Chemistry**

Synthesis and characterization of well-defined polyelectrolytes

Different types of polyelectrolytes (including hydrophobically modified ones) were synthesized and characterized by means of dynamic and static light scattering as well as different potentiometric titration techniques.

Interactions between colloidal particles and polyelectrolytes

The adsorption of polyelectrolytes on the surface of colloidal particles (kaolin, barium sulfate, sludge) is investigated by using different methods of charge determination (electrophoretic light scattering, streaming potential, acoustophoresis).

Polyelectrolyte complex formation

The complex formation behavior of oppositely charged polyelectrolytes is investigated at different polymer concentrations. In diluted systems the research is focused on the complex formation mechanism by using static and dynamic light scattering techniques. The cooperative nature of complex formation in mixed polyelectrolyte-surfactant systems has been investigated by using a potentiometric technique based on a surfactant selective electrode. Concentrated polyanion-polycation systems are characterized by means of polarising microscopy, DSC-measurements, and wide angle X-ray scattering. In addition, protein-polysaccharide complexes are characterized by electron microscopy.

Nanoparticle formation in colloidal template phases

The structure formation in liquid crystalline lamellar systems, consisting of water/long chain alcohol/surfactant, is investigated in absence and presence of polyelectrolytes. Phenomena of self-organization in amphiphilic mesophases are used to modify the bilayer structures by incorporation of polyelectrolytes. SANS measurements show a temperature induced transition from a compact to a more swollen liquid crystalline phase in such polymer-modified systems.

To what extent polymers favour or restrain the formation of microemulsions is revealed by the phase diagrams in multi-component systems. The influence of polymers on the phase behavior is studied by means of electric conductivity, rheology, NMR relaxation and self-diffusion experiments, polarising microscopy, micro-DSC, and electron microscopy. The incorporation of polyelectrolytes can induce the extension of the isotropic liquid crystalline phase as well as transitions to lamellar liquid crystalline phases.

Polyelectrolyte-modified microemulsions can be used as a new type of template for the controlled nanoparticle formation. Polyelectrolyte-stabilized nanoparticles (e.g. bariumsulfate, gold, cadmiumsulfide) can be redispersed after solvent evaporation.

Prof. Dr. Anna Köhler

**Universität Potsdam, Institut für Physik
Experimentalphysik**

Research Areas

My research is concerned with the electronic structure of organic semiconductors. In contrast to most inorganic semiconductors, organic materials can be processed easily from solution. This opens up new, highly promising manufacturing routes such as ink-jet printing for the low-cost production of opto-electronic devices such as light-emitting displays (LEDs), solar cells and transistors.

In order to advance organic devices it is imperative to understand very clearly how excited states are generated and what determines their energy and extent, how they migrate through the semiconductor, and how they decay. When addressing these issues I focus in particular on the relationship between electronic, chemical and morphological structure. We therefore use time-resolved luminescence and absorption spectroscopy in combination with electrical and structural studies.

My research group is integrated in the Interdisciplinary Center for Photonics Potsdam (ICP)

<http://www.izp.uni-potsdam.de>

Prof. Dr. Gerhard Koßmehl
(retired)

The scientific projects at Freie Universität Berlin are finished.

Aim of research has been:

Electrical conductive polymers and organic compounds, liquid crystalline polymers and compounds, hydrogels and other polymers for application in ophthalmic medicine, modification of polymer surfaces, reactive polymers - reactions on and with polymers, sensors on the basis of enzyme electrodes, polymers in agriculture, organic long time fertilizers.

Within the scope of WiTeBü Berlin are offered chemical and technical chemical consultations and examinations, especially for middle class companies without scientific personal.

Also offered are popular-scientific presentations (lectures, seminars, arrangements, experimental shows) for the information of non-chemists in general chemical problems in everyday life. Topics are: organic and macromolecular chemistry, material sciences, environmental problems and everyday life chemistry.

“Freundeskreis Chemie-Museum Erkner g. e. V.“ (chairman: Prof. Dr. Gerhard Koßmehl) is active in founding a „Chemistry Museum“. This has been started an exhibition about the history of polymers developed in the region Berlin and Brandenburg and will be extended to plastic materials in general, fiber materials and later on to drugs, dyestuffs, explosives and other chemical topics including also biochemistry and biotechnology.

A “Forum Chemie” is also in the process of organization for general information about chemistry for students and interested persons. It offers lectures, experimental shows, seminars, inspection tours to chemical companies as well as special lessons for students extending the official educational curriculum. Also a chemistry library and a computer information center will be developed.

Prof. Dr. André Laschewsky

**Fraunhofer-Institut für Angewandte Polymerforschung und
Universität Potsdam, Institut für Chemie
Chair for Applied Polymer Chemistry**

The research interests focus on the design, the synthesis and the characterization of novel functional monomers and polymers. Particular attention is paid to polymers in aqueous media, the self-organization of polymers therein and at interfaces, and the functionalization of the assemblies formed. The understanding of the correlation between molecular architecture, supramolecular structure and macroscopic properties of polymers is aimed at.

Recent activities comprise:

New monomers which are suited for polymerization reactions in aqueous media

New polymerization reactions that are suited for aqueous media

New methods of "controlled free radical polymerization"

Amphiphilic monomers and polymers:
polymeric monolayers and multilayers, polymeric lyotropic liquid crystals, micellar polymers, polymeric surfactants, polymeric model membranes

Novel emulsifiers for emulsion polymerization

Hydrogels

Polymer surfaces

(Ultra)Thin polymer coatings

Ion containing polymers
(polyelectrolytes, polyelectrolyte complexes, polyzwitterions, ionomers, blends of polymers and inorganic compounds (hybrid materials))

Stimuli-responsive polymers

Polymers for non-linear optics

Prof. Dr. Andreas Lendlein

**GKSS Research Centre Geesthacht GmbH
Institute of Polymer Research**

The Institute of Polymer Research is one of three institutes of the GKSS Research Centre Geesthacht GmbH, which is a member in the Helmholtz Association of National Research Centres. The Institute of Polymer Research has two locations, Geesthacht in Schleswig-Holstein and Teltow in Brandenburg. Prof. Dr. Andreas Lendlein is the institute head in Teltow.

The research fields of the Institute of Polymer Research in Teltow enclose polymer research within two programmes of the Helmholtz Association:

- Regenerative Medicine in the Research Field Health
- Functionalised Materials in the Research Field Key Technologies

The programme **Regenerative Medicine** is the main focus of the research activities at the location Teltow of the Institute of Polymer Research. In general, Regenerative Medicine deals with the regeneration of non-functional cells, tissues, and organs by biological replacement by e.g. in vitro grown tissues as well as by the stimulation of regeneration and repair processes in the human body.

Currently, a network of excellence is established with a close contact between other research centres, hospitals and industry. Thus, it is facilitated to transfer results of basic research and material developments in the laboratory scale into the clinical praxis. The Institute of Polymer Research contributes biomaterial research from the development of new materials up to limited-lot productions into the cooperation network.

The institute's special competence is the development and investigation of degradable and stabile biomaterials, which are processed into dense and porous fibres, films and membranes from solution or melt. The resulting products are evaluated concerning their toxicity and biocompatibility. Investigated material systems in the research area Biomaterials are biostabile, as well as synthetic, biodegradable materials, stimuli-sensitive polymer materials and biomimetic material modifications.

The developed biomaterials are on the one hand used for the production of scaffolds for Tissue Engineering. The functional tissue grown on these scaffolds should then replace tissues damaged or lost by illness, injury or surgery. Another field of application for the developed biomaterials is the production of adsorber and support materials for apheresis and biohybrid organs to assist or substitute organ functions (Organ Assist Systems).

Functionalised Materials is a main part of Helmholtz-programme “Advanced Engineering Materials” in the Research Field Key Technologies:

The development of polymer based multifunctional materials for applications with high social and economic impact is a central task of this programme topic. Multifunctional are materials that show an unexpected combination of two different key functionalities, like for example biocompatibility, biodegradability, specific surface properties, separation properties, catalytic properties, certain mechanical properties or shape-memory properties. Here, combinations of materials are to be considered in which macroscopic properties can be tailored in a wide range by only small changes in their chemical structure and processing conditions.

The development of new multifunctional materials with tailored properties requires more and more the use of knowledge based strategies. In this context modelling and simulation on different length and time scales play a key role. The results shall lead to a better understanding of the underlying structure-property relations and the interactions between basic properties and high level functionalities and thus contribute to the development of new materials.

Dir. & Prof. Dr.-Ing. Werner Mielke

**Federal Institute for Materials Research and Testing
Division VI.3 “Durability of Polymers”**

The division is part of the department VI “Materials Protection and Surface Technologies”

Its tasks are

- Investigation and testing of the resistance of engineering and functional polymers to chemical, thermal and photochemical attack
- Thermal analysis of polymers
- Investigation of the fire retardancy of polymers
- Physical characterisation of degradation and cross-linking processes
- Development of methods for the acceleration of ageing tests and of methods for the early detection of ageing phenomena in polymers
- Development of reference methods, establishment of rules and specifications for ageing tests
- Development and supply of elastomeric reference materials as part of the economic infrastructure for materials testing
- Giving advice and information to the Federal Government, other authorities, standard organisations, associations and private persons

Further projects and a summary of methods and technical equipment can be found at

http://www.bam.de/en/kompetenzen/fachabteilungen/abteilung_6/fg63/

Further activities:

- Secretary of the German Society of Rheology (“Deutsche Rheologische Gesellschaft (DRG) e. V.”) **<http://www.drg.bam.de>**

Prof. Dr. Helmuth Möhwald

Max Planck Institute of Colloids and Interfaces, Potsdam/Golm
Department: Interfaces

Research of the group with polymers concentrates on their interactions at interfaces, in ultrathin films and grafted onto inorganic nanoparticles. This yielded the following research highlights:

- Hollow capsules with walls controlled with nm precision enable processes in confined geometry like catalysis, crystallization and precipitation. Their permeation can be selectively tuned via pH, ionic strength and chemical composition. Individual capsules can be addressed by light, microwaves or ultrasonic radiation thus enabling a local drug delivery via switched release.
- Ultrathin polyelectrolyte films may exhibit glass transitions near room temperature distinguished by a decrease of the Young modulus by two orders of magnitude and by the release of water.
- Increasing the temperature hollow capsules may change their shape determined by the competition of lateral electrostatic repulsion and surface energies.
- A strong isotope effect is observed for water adsorption in polyelectrolyte multilayers.
- Composites of polyelectrolytes and electron transfer proteins enable long distance electron transfer in ultrathin films. This may be made use of in biosensor applications.
- Polymer brushes can be synthesised on inorganic nanoparticles like Au, Ag, CdTe, Fe₃O₄. This stabilizes the particles in aqueous and organic solution, depending on the type of brush. Tuning the chemistry of the brush one may arrive at 90° contact angles, enabling quantitative particle enrichment at the water/oil interface. The brush can also be prepared sufficiently large to allow protein incorporation.
- Preparing particle coatings with hydrogen bonding groups they may be incorporated inside hydrogels. From there they are released only if the H-bonds are broken.

**Universität Potsdam, Institut für Physik
Physik Weicher Materie**

Field of research

Electroluminescence devices

Polyfluorene-based LEDs, highly-efficient electrophosphorescence

Polymer composite devices

Polymer based solar cells, polymer blend emission layers, polymer nanoparticles

Polymer-based field-effect-transistors

Correlation between morphology and transport properties of thin polymer layers, improvement of transistor properties by interface design

Transient photoconductivity in multicomponent polymer layers

Photoconductivity and charge carrier generation in organic composites, modeling of response time, determination of trap densities

Photomechanics with azobenzene polymers

Experimental and theoretical studies on the light-induced changes in mechanical properties of azobenzene polymer layers

Electromechanics

Measurement of the mechanical properties of ultrathin layers as a function of temperature and frequency, photoinduced softening, grafted polymer layers, ferroelectric polymers

Prof. em. Dr. habil. Dr. h. c. Burkart Philipp
(retired)

Main topic was the history of the Teltow-Seehof area of polymer and colloid research in connection with the 10th anniversary of the new institutes founded in 1992. Besides this, advisory activities to scientists and institutions in chemistry, physics and technology of cellulose are to be mentioned.

Prof. Dr. Jürgen P. Rabe

**Humboldt-Universität zu Berlin
Institut für Physik**

Research Topics:

- Structure and dynamics of molecular nanostructures
- Correlation with electronic, optical, mechanical and (bio-)chemical properties from molecular to macroscopic length and time scales
- Fabrication of nanostructures from synthetic and biological macromolecules employing interfacial forces and selforganization
- Molecular dynamics simulations
- Development of methods for interfacial optics and scanning probe microscopies including STM, SFM and SNOM
- Basic research for a molecular information technology

R&D-Equipment:

- UHV and HV-deposition of metals and molecular materials
- XPS, UPS, LEED
- Plasmareactors
- Physical-chemical preparation and characterisation of thin organic films (spin-coating, self-assembly, Langmuir-Blodgett-technique)
- Confocal optical microscopy
- Imaging ellipsometry & Brewster-Angle Microscopy
- Tunneling-Microscopy & -Spectroscopy (STM/STS) at solid-liquid/gas-interfaces and under electrochemical control
- Dynamic Force-Microscopy (SFM) in UHV and at solid-liquid/gas-interfaces
- Optical Nearfield-Microscopy (SNOM)
- Workstations for Molecular Dynamics-Simulations

Information in WWW:

<http://www.polymerphysics.de>

Prof. Dr. K.-H. Reichert
(retired)

Technische Universität Berlin
Institut für Chemie

Research Topics

- Polyester synthesis, Development of methods for fast screening of catalysts in laboratory scale, Catalyst synthesis and polycondensation kinetics, Studies on chemical reaction and mass transport
- Gas phase and liquid phase polymerization of propylene with novel heterogeneous catalysts, Video microscopic studies of single catalyst particle growth during polymerization reaction and morphological studies of polymer particles
- Gas phase and liquid phase polymerization of propylene in controlled mini reactor, Studies of polymerization kinetics and polymer properties, Modelling and process design

R & D - Equipment (own development)

- Micro balance reactor for kinetic studies of gas phase polymerization and monomer absorption in polymers
- Mini reactor for video microscopic studies of catalyst particle growth and polymer morphology during polymerization reaction
- Controlled mini reactor for gas phase and liquid phase polymerization of olefins

Prof. Dr. Reinhard Schomäcker

**Technische Universität Berlin
Fachgebiet Technische Chemie**

1) Homogeneous Catalysis in Microemulsions

Reactions of hydrophobic reactants with hydrophilic catalysts like enzymes or metal complexes are carried out with high rates by means of microemulsions. By means of these reaction media the advantages of homogeneous and heterogeneous catalyses can be combined.

2) Reaction Engineering for Production of Nanoparticles in Microemulsions

The development of procedures for synthesis of nanoparticles in microemulsions requires the detailed understanding of this complex process of particle formation in the micro-heterogeneous medium. The mechanism was found to be very similar to that of emulsion polymerization.

3) Catalytic Membrane Reactors

Polymer/metal and ceramics/metal composite materials are applied for the preparation of catalytically active membranes. These membranes are especially useful catalysts for partial hydrogenation or oxidation reaction. The selectivity for the desired partially hydrogenated product is greatly improved, because disadvantageous effects of mass transport phenomena on the kinetics are widely suppressed. The performance of the catalyst is improved nearly to the limitation determined by the intrinsic kinetics.

4) Reaction Kinetics in Multiphase Systems

Determination of micro and macro kinetic parameters and development of models for description of reactions in micellar solutions, emulsions and microemulsions. For kinetic investigations conventional and relaxation methods are used. Concepts for the reactor and process design are developed on the basis of the kinetic investigations. Different types of simulation tools are applied for this purpose. The production of hydrogen is an important example of these activities.

Priv.-Doz. Dr. Andreas Schönhals

**Bundesanstalt für Materialforschung und -prüfung (BAM)
Fachgruppe VI.5: Polymeroberflächen**

The main research field is the investigation of molecular dynamics and the structure of complex polymeric systems. Experimental main methodologies are relaxation methods like broadband dielectric spectroscopy. The main point is the evaluation of molecular mechanisms and its theoretical understanding. Moreover new measuring techniques and evaluation strategies are under consideration.

Actual topics

Molecular dynamics of low molecular weight glass forming systems and polymers in confining geometries like nanoporous glasses, zeolithes and on surfaces

Correlation of molecular dynamic, photochemical and photochemical induced processes in photochromic polymers

Structure and molecular dynamic of liquid crystalline polymers

Sorption and permeation of gases trough complex polymeric systems

Molecular dynamic simulation of selected polymeric structures and comparison with experimental data

Priv.-Doz. Dr. Burkhard Schulz

**Universität Potsdam, Institut für Physik und
Institut für Dünnschichttechnologie und Mikrosensorik**

Objects of Research

Polymer synthesis

- Synthesis of heat resistant polymers and preparation of fibres, membranes and ultra thin films
- Synthesis of high performance polymers for applications in nanotechnology, microsystem technology, and microsensors
- Polymerisation and chemical modification of side chain polymers as photo-active materials for data storage or for microsensors
- Preparation and processing of electrically conducting polymers

Preparation and investigation of supramolecular and nanosized structures

- Preparation and characterisation of highly ordered layers based on substituted aromatic oxadiazoles and polyoxadiazoles by vacuum deposition methods, Langmuir-Blodgett technology and self assembling techniques
- Investigation of the structural, spectroscopic and optical behaviour of organic materials under ultrahigh pressure

In co-operation with the Institute for Thin Film and Microsensoric Technology Teltow (<http://www.idm-teltow.de>)

- Synthesis of new polymers as sensitive materials or as resists for e-beam- and deep UV- lithography (polyimides and other polyheterocycles)
- Synthesis of photoactive materials like azobenzene containing main chain and side chain polymers
- Polymer surface characterisation by AFM, ATR-IR-spectroscopy and contact angle measurements

Prof. Dr. J. Springer
(retired)

Technische Universität Berlin
Fachgebiet Makromolekulare Chemie

The research concerns with the interdependencies between the chemical structure and the physical resp. physico-chemical properties of polymers. The topics within this research are:

- Synthesis, analytic and properties of functional polymers
- Rheo-optical properties of polymer solutions
- Gas permeability of polymers
- Interfacial properties of polymers

The execution of experimental investigations within these research fields has been finished. The activities are limited to the composition of publications, doctoral certificates and the examination of manuscripts as referee.

For further information please visit the web site:

<http://www.tu-berlin.de/~itc/springer>

Prof. Dr.-Ing. Manfred H. Wagner
Emeritus: Prof. Dr. Helmut Käufer

Technische Universität Berlin
Polymer Engineering and Physics Group

Polymer Engineering and Physics together with the Groups of Glass, Ceramic, and Metallic Materials Science and Engineering form the Institute of Materials Science and Technology of TU Berlin. The Institute is part of Faculty III Process Sciences. The Polymer Engineering and Physics Group offers students of "Material Science" the subject "Organic Materials" to specialise in, and students of other engineering fields (mechanical engineering, process engineering, biomedical engineering, civil engineering, business administration and engineering, architecture) compulsory and optional courses with a focus on polymer engineering and physics.

The Polymer Engineering part of the group with its polymer processing laboratory is located in the building WF at Fasanenstrasse 90. The Polymer Physics part of the group together with the groups of glass and ceramic materials are situated at Englische Strasse 20. On an overall lab and office space of about 2400 m², the Polymer Engineering and Physics Group is well endowed with all important machinery and equipment for polymer processing (extrusion, film blowing, injection moulding, hot pressing and forming etc.) and polymer testing (mechanical, rheological, thermal, electrical, morphological). Main research fields are:

- Rheology of polymer melts and solutions, development of rheological constitutive equations, analysis and optimisation of polymer engineering processes
- Innovative applications of polymer engineering techniques in biomedical engineering, e.g. polymer stents with shape memory effect, development of polymer products for biomedical engineering (lenses, surgical suture, dental implants, catheter, polymer stents and polymeric coating of stents)
- Development of polymer-metal precursors for high temperature super conductive films
- CAD based engineering of all kind of plastic parts
- Development of a mini-injection moulding machine and mini-test bars for evaluation of mechanical properties of polymer materials on the basis of 3 to 5 g of material
- Recycling of plastic waste from PVC, PE, PP, PA, PC, electronic boards from epoxy resin, etc. Recycling of polymer composites from packing residues by dissolution; reprocessing of polymer and solvent
- Analysis of structure and morphology of polymers (density, dielectric and mechanical measurements, wide and small angle x-ray measurements, DSC)
- Analysis of mechanisms of deformation and relaxation of polymers and polymer composites
- Mechanical and optical spectroscopy of polymeric materials
- Thermal analysis of thermoplastics and their composites
- Fibre-reinforced high-performance composites from glass, aramid and carbon fibre with thermoplastic matrices
- Mechanical and optical spectroscopy of polymeric materials

<http://www.tu-berlin.de/fb6/polymer>
<http://www.tu-berlin.de/fb6/polymerphysik>

Conferences and Workshops

Amherst Rheology Course Berlin (ARC 2005)

Date: 7-8 April, 2005
 Place: Technical University of Berlin, Polymertechnik, Polymerphysik
 Organizer: Prof. Dr. M.H. Wagner, Technical University of Berlin, and Prof. Dr. H.H. Winter (University of Massachusetts, Department of Chemical Engineering, Amherst, Mass., USA)
 Participants: 24

1. Bilateral Symposium on Heterocyclic and Heterochain Polymers for High Performance Applications

Date: 6-12 June, 2005
 Place: Iasi, Romania
 Organizer: PD Dr. Burkhard Schulz, University of Potsdam, Institute of Physics, and Institute for Thin Films and Microsensoric Technology Teltow
 Participants: 50 participants from academic institutions

FRPM'05 - 10th European Meeting on Fire Retardancy and Protection of Materials (10th European Conference on Fire Retardant Polymers)

Date: 7-9 September, 2005
 Place: Federal Institute for Materials Research and Testing (BAM), Berlin
 Organizer: Dr. Bernhard Scharrel, Organizer: BAM, Division VI.1 - Durability of Polymeric Materials with eurolab-Deutschland
 Topic: Fundamental aspects in fire behaviour and fire retardancy, fire retardancy of polymers, fire retardancy of textiles, nanocomposites, new materials/fire protective materials, industrial application, regulation and standardisation, environmental aspects
 Participants: 200

SOCRATES-EURHEO-Meeting

Date: 9-11 September, 2005
 Place: Technical University of Berlin, Polymertechnik, Polymerphysik
 Organizer: Prof. Dr. M.H. Wagner, Technical University of Berlin
 Participants: 14

Publications

Some members of the BVP (being head of institutes or departments) are responsible for a large number of independently working scientists. Only those papers are listed here to which they have individually contributed.

M. Abboud, P. Denifl, K.-H. Reichert
Advantages of an Emulsion-Produced Ziegler-Natta
Macromolecular Materials and Engineering **290**, 1220 (2005)

M. Abboud, P. Denifl, K.-H. Reichert
Fragmentation of Catalysts Particles During Propylene Polymerization
Macromolecular Materials and Engineering **290**, 558 (2005)

M. Abboud, P. Denifl, K.-H. Reichert
Morphological and kinetics studies on novel Ziegler-Natta catalysts for Propylene polymerization
Journal of Applied Polymer Science **98**(5), 2191 (2005)

D. Akcakayiran, D.G. Kurth, S. Röhrs, G. Rupprechter, G.H. Findenegg
Self-assembly of a metallo-supramolecular coordination polyelectrolyte in the pores of SBA-15 and MCM-41 silica
Langmuir **21**, 7501-7506 (2005)

W. Albrecht, K. Kneifel, T. Weigel, R. Hilke, R. Just, M. Schossig, K. Ebert, A. Lendlein
Preparation of highly asymmetric hollow fiber membranes from poly(ether imide) by a modified dry/wet phase inversion technique using a triple spinneret
Journal of Membrane Science **262**(1-2), 69-80 (2005)

G. Altankov, W. Albrecht, K. Richau, T. Groth, A. Lendlein
On the tissue compatibility of poly(ether imide) membranes: An in vitro study on their interaction with human dermal fibroblasts and keratinocytes
Journal of Biomaterials Science - Polymer Edition **16**(1), 23-42 (2005)

A. Alteheld, Y. Feng, S. Kelch, A. Lendlein
Bioabbaubare, amorphe Copolyester-Urethannetzwerke mit Formgedächtniseigenschaften
Angew. Chem. **117**, 1212-1216 (2005)

A. Alteheld, Y. Feng, S. Kelch, A. Lendlein
Biodegradable, Amorphous Copolyester-Urethane Networks Having Shape-Memory Properties
Angew. Chem. Int. Ed. **44**, 1188-1192 (2005)

Z. An, C. Tao, G. Lu, H. Möhwald, S. Theng, Y. Cui, J. Li

Fabrication and Characterization of Human Serum Albumin and L- α -Dimyristoylphosphatidic Acid Microcapsules Based on Template Technique
Chem. Mater. **17**, 2514-2519 (2005)

X. Arys, A.M. Jonas, A. Laschewsky, R. Legras, F. Mallwitz
Layered Polyelectrolyte Assemblies
Chapter 19 in: "Supramolecular Polymers 2", A. Ciferri (Ed.), Marcel Dekker,
CRC press, Boca Raton, New York, 651-710 (2005)

J. Ba, J. Polleux, M. Antonietti, M. Niederberger
Non-aqueous Synthesis of Tin Oxide Nanocrystals and Their Assembly into Ordered
Porous Mesostructures
Adv. Mater. **17**(20), 2509-2512 (2005)

S.A. Bagnich, H. Bässler, D. Neher
Exciton dynamics in ladder-type methyl-poly(para-phenylene) doped with
phosphorescent dyes
J. Lum. **112**, 377-380 (2005)

M. Bertmer, A. Buda, I. Blumenkamp-Höfges, S. Kelch, A. Lendlein
Biodegradable Shape-Memory Polymer Networks: Characterization with Solid-State
NMR
Macromolecules **38**, 3793-3799 (2005), published online: DOI 10.1021/ma0501489G

M. Bertmer, A. Burda, I. Blumenkamp-Höfges, S. Kelch, A. Lendlein
Solid-state NMR Characterization of Biodegradable Shape-memory polymer
networks
Macromol. Symp. **230**, 110-115 (2005)

A. Bismarck, M. Pfaffernoschke, J. Springer, E. Schulz
Polystyrene grafted Carbon Fibers: Surface Properties and Adhesion to Polystyrene
J. Thermoplastic Composite Mater. **18**, 307-331 (2005)

Y. Bodenthin, U. Pietsch, J. Grenzer, Th. Geue, H. Möhwald, D.G. Kurth
Structure and Temperature Behavior of Metallo-supramolecular Assemblies
J. Phys. Chem. B **109**, 12795-12799 (2005)

Y. Bodenthin, U. Pietsch, H. Möhwald, D.G. Kurth
Inducing Spin Crossover in Metallo-supramolecular Polyelectrolytes through an
Amphiphilic Phase Transition
J. Am. Chem. Soc. **127**, 3110-3114 (2005)

M. Böhning, H. Goering, A. Fritz, K.W. Brzezinka, G. Turkey, A. Schönhals,
B. Scharrel
Dielectric study of molecular mobility in poly(propylene-graft-maleic anhydride)
/clay nanocomposites
Macromolecules **38**, 2764-2774 (2005)

C. Böttcher, B. Schade, C. Ecker, J.P. Rabe, L. Shu, A.D. Schlüter
Double helical ultrastructure of polycationic dendronized polymers determined
by single particle cryo-TEM
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Silica nanocasting of lyotropic liquid crystals: material science or an analytical tool?
RSC Discussion Meeting "New directions in liquid crystal science", London, UK,
5-6 December, 2005

G. Boese, A. Lendlein

Biomaterial and scaffold engineering for regenerative medicine
XVIIIth Aachen Colloquium on Biomaterials, Aachen, 15 March, 2005

M. Bruma, B. Schulz

Synthesis and Study of Silicon-containing Polyoxadiazoles for Advanced Applications
MPG-MOEL-Symposium Science and Art in Europe, Dresden, 23-25 May, 2005

U. Buller

(In) Zukunft: Chemie?!

Chancen nutzen - mit Risiken umgehen - nachhaltig entscheiden
Sonntagovorlesung, Potsdam, 4 September, 2005

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Neue Polymermaterialien für den Fahrzeugbau
Microcar 2005, Leipzig, 21 June, 2005

G. Buntkowsky, B. Grünberg, A. Vyalikh, T. Emmler, W. Masierak, G.H. Findenegg,
H.-H. Limbach

Dynamics of simple and binary liquids in mesoporous silica
Bunsentagung, Frankfurt/Main, 5-7 May, 2005

E. Coquelle, P. Ilg, S. Hess
Ferrofluid simulation using Brownian dynamics: the role of hydrodynamic interactions
6. Ferrofluid Workshop Saarbrücken, 20-22 July, 2005

E. Coquelle, P. Ilg, S. Hess
Simulation of a ferrofluid using Brownian dynamics: the role of hydrodynamic interactions
6th Liquid Matter Conference, Utrecht, The Netherlands, 2-6 July, 2005

A. Ebert, J. Kunze, H.-P. Fink
NMR-spectroscopy of cellulose and cellulose derivatives in the solid state and in solution
EU-COST E41 Meeting "Spectroscopic techniques for the analysis of carbohydrates, lignin, and extractives", Barcelona, Spain, 25-26 April, 2005

F.A. El-Toufaily
Mechanism of Hydrotalcite catalyzed PET Synthesis
Dow Europe GmbH, Schkopau, September 2005

M. Entrialgo, A. Lendlein, D. Hofmann
Molecular Modeling of Hydrolytically Degradable Polyesters
3rd European Symposium on Biopolymers, ESBP05, Madrid, Spain,
23-25 November, 2005

Y. Feng, S. Kelch, A. Lendlein, A. Alteheld
Amorphous Biodegradable Shape-Memory Poly(esterurethane) Networks as Stimuli-sensitive Implant Materials
International BIOSURF VI Conference, Lausanne, Switzerland,
21-23 September, 2005

G.H. Findenegg
Adsorption and self-assembly of amphiphiles at surfaces and in mesopores
Symposium on Surfactant Self-Assembly, North Carolina State University, Raleigh, USA, 16 November, 2005

G.H. Findenegg
Vapor adsorption in periodic mesoporous solids studied by in-situ small-angle scattering techniques
BENSC Adsorption Workshop, Berlin, 21 September, 2005

G.H. Findenegg, H. Bock, O. Dietsch, A. Eltekov
Adsorption and self-assembly of surfactants in nanopores
AIChE Annual Meeting, Cincinnati, OH, USA, 31 October - 4 November, 2005

G.H. Findenegg, S. Jähnert, M. Taherkhani, B. Grünberg, T. Emmler,
G. Buntkowsky, G. Zickler, O. Paris

Structural characterization of physisorbed vapor films in periodic mesoporous silica by ^1H MAS NMR and in-situ SANS
7th Int. Symposium on the Characterisation of Porous Solids, 25-28 May, 2005

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Structural characterization of adsorbed films in periodic mesoporous silica by in-situ X-ray diffraction
AIChE Annual Meeting, Cincinnati, OH, USA, 31 October - 4 November, 2005

H.-P. Fink
Structural aspects of cellulose based materials
Seminar lecture, Max-Planck-Institute of Colloids and Interfaces, Department of Biomaterials, Potsdam-Golm, 3 March, 2005

H.-P. Fink, J. Ganster, O. Geiger
Neue thermoplastische Verbundmaterialien mit Celluloseregeneratfasern
44th Int. Chemiefasertagung, Dornbirn, Austria, 21-23 September, 2005

H.-P. Fink, J. Ganster, P. Weigel
Novel composites with man-made cellulosic fibers
229th ACS National Meeting, San Diego, CA, USA, 13-17 March, 2005

H.-P. Fink, J. Kunze
Effects of NaOH-urea-solutions on cellulose
Japanese-European Workshop "Cellulose and functional polysaccharides", Vienna, Austria, 12-14 September, 2005

P. Frübing, A. Kremmer, R. Gerhard-Multhaupt
Influence of the amorphous phase on piezoelectricity in polyamide 11
69. Jahrestagung der Deutschen Physikalischen Gesellschaft, Berlin, 4-9 March, 2005

J. Ganster, H.-P. Fink
Cellulose-Spinnfasern zur Verstärkung von PP und anderen Thermoplasten
3. N-FibreBase Kongress, Hürth bei Köln, 9-10 June, 2005

J. Ganster, H.-P. Fink
Rayon-verstärkte Thermoplaste für den Spritzguss
5th Int. Symp. Werkstoffe aus Nachwachsenden Rohstoffen, Erfurt, 1-2 September, 2005

S. Garnier, A. Laschewsky
Neue Tenside aus Blockcopolymeren
Jahreshauptversammlung der SEPAWA e.V., Landesgruppe West, Gladbeck, 25 November, 2005

S. Garnier, A. Laschewsky
Synthesis of New Amphiphilic Block Copolymers by RAFT-Polymerization and their Self-Assembly
42nd Meeting of the German Colloid Society, Aachen, 26-28 September, 2005

S. Garnier, A. Laschewsky
Synthesis of New Amphiphilic Diblock Copolymers via RAFT-Polymerization

and their Self-Assembly

Tag der Chemie, Freie Universität Berlin, 8 June, 2005

R. Gerhard-Multhaupt

Ferroelectrets: Elektrisch geladene Polymerschäume für Sensor- und Aktoranwendungen

Institut für Festkörperelektronik, TU Dresden, 13 July, 2005

R. Gerhard-Multhaupt

Polymer ferroelectrics and ferroelectrets

69. Jahrestagung der Deutschen Physikalischen Gesellschaft, Berlin, 4-9 March, 2005

S. Heidenreich, P. Ilg, S. Hess

Dynamics of liquid crystals with an improved Landau-de Gennes potential

69. Jahrestagung der DPG, Berlin, 4-9 March, 2005

S. Heidenreich, P. Ilg, S. Hess

Orientalional dynamics in spatially inhomogeneous liquid crystals with an improved Landau-de Gennes potential

6th Liquid Matter Conference, Utrecht, The Netherlands, 2-6 July, 2005

S. Heidenreich, P. Ilg, S. Hess

Orientalional dynamics of nematics with an improved Landau-de Gennes potential

XXV. Dynamic Days Europe 2005, Berlin, 25-28 July, 2005

O. Hess, C. Goddard, S. Hess

Rheo-Chaos in Nonlinear Maxwell-Fluids

XXV. Dynamic Days Europe 2005, Berlin, 25-28 July, 2005

S. Hess

Modelling the dynamics of shear-thickening-shear-thinning fluids and the flow behavior of substances with yield stress

Soft Matter Mathematical Modelling, Cortona, Italy, 11-16 September, 2005

S. Hess, S. Heidenreich, P. Ilg, M. Kröger

Regular and chaotic flow behavior and orientational dynamics of tumbling nematics

3rd International Workshop on Complex Systems, Sendai, Japan, 16-19 November, 2005

S. Hess

Structure of streaming fluids

UMR CNRS, Univ. du Maine, Le Mans, France, 11 October, 2005

S. Hess

Thermodynamic and mesoscopic modelling of tumbling nematics, of shear-thickening fluids and of stick-slip-like behavior

thermocon2005, Messina, Italy, 25-30 September, 2005

S. Hess, O. Hess

Shear thickening, stick-slip like flow behavior and rheo-chaos in non-linear

Maxwell model fluids

69. Jahrestagung der DPG, Berlin, 4-9 March, 2005

S. Hess, H. Steuer

Derivation and application of a direct method for the computation of the Frank elasticity coefficients of a liquid crystal

6th Liquid Matter Conference, Utrecht, The Netherlands, 2-6 July, 2005

D. Hofmann, A. Lendlein

Aktuelle Situation der regenerativen Medizin in Deutschland

German-Japanese Seminar on Regenerative Medicine, Mie, Japan, 17 March, 2005

D. Hofmann, A. Lendlein

Multifunctional Biomaterials for Regenerative Medicine

BioJapan, Yokohama, Japan, 8 September, 2005

D. Hofmann, A. Lendlein

(Multi-) Functional Materials

E-MRS Spring Meeting, Strassbourg, France, 31 May - 1 June, 2005

P. Ilg, S. Hess

On the theory of the shear-induced isotropic-to-nematic phase transition of side chain liquid-crystalline polymers

69. Jahrestagung der DPG, Berlin, 4-9 March, 2005

P. Ilg, S. Hess

Two-alignment tensor theory of the shear-induced isotropic-to-nematic phase transition of side chain liquid-crystalline polymers

AERC 2005 2nd Annual European Rheology Conference, Grenoble, France, 21 April, 2005

P. Ilg, M. Kröger, S. Hess

Anisotropic magnetoviscosity and the role of dipolar interactions: Comparison of nonequilibrium molecular simulations and dynamical mean-field theory

6th Liquid Matter Conference, Utrecht, The Netherlands, 2-6 July, 2005

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Dynamics and magnetoviscosity of ferrofluids: Comparison of many-particle simulations and dynamical mean-field theory

6. Ferrofluid Workshop Saarbrücken, 20-22 July, 2005

S. Jähnert, G. Zickler, O. Paris, G.H. Findenegg

Characterization of adsorbed layers in ordered mesoporous silica by in-situ small-angle X-ray diffraction

42nd Biennial Meeting of the German Colloid Society, Aachen, 26-28 September, 2005

F. Jaiser, L. Kulikovskiy, D. Neher, S. Köber, K. Meerholz

Charge carrier trapping in PVK-TPD blends

Optics and Photonics, SPIE 50th Annual Meeting, San Diego, USA, 31 July - 4 August, 2005

S. Kelch, G. Malsch, B. Seifert, W. Albrecht, A. Lendlein

Cell and Blood Compatibility of Polyacrylonitrile (PAN) and PAN-Copolymers

24. Jahrestagung der Deutschen Gesellschaft für Klinische Mikrozirkulation und Haemorheologie, Rostock, 15-17 September, 2005

S. Kheirandish, M.H. Wagner
 Are Zero-Shear Viscosities Independent of Molecular Weight Distribution?
 VDI-GVC-Fachausschusssitzung "Rheologie", Universität Dortmund,
 27 February - 2 March, 2005

S. Kheirandish, M.H. Wagner
 Quantitative Prediction of Transient and Steady-State Elongational Viscosity of Monodisperse Polystyrene Melts
 2nd Annual European Rheology Conference (AERC 2005), University of Grenoble, France, 19-25 April, 2005

J. Koetz
 Colloidal Stability
 Biopolymers in Materials and Life Sciences, Training Course for Advanced Students, Campinas, Brazil, 20 October, 2005

J. Koetz
 Emulsions and Microemulsions
 Biopolymers in Materials and Life Sciences, Training Course for Advanced Students, Campinas, Brazil, 20 October, 2005

J. Koetz
 Introduction to Colloidal Systems
 Biopolymers in Materials and Life Sciences, Training Course for Advanced Students, Campinas, Brazil, 19 October, 2005

J. Koetz
 Kolloidchemie
 Summer School Chemische Nanotechnologie, Saarbrücken, 10 October, 2005

J. Koetz
 Nanopartikelbildung in polymermodifizierten Mikroemulsionen
 Summer School Chemische Nanotechnologie, Saarbrücken, 10 October, 2005

J. Koetz
 Polyelectrolyte addition for stabilising and destabilising colloidal white pigments
 PTS Grenzflächen-Symposium, München, 8 June, 2005

J. Koetz
 Polyelectrolytes and Self-organization
 Biopolymers in Materials and Life Sciences, Training Course for Advanced Students, Campinas, Brazil, 18 October, 2005

J. Koetz
 Polyelektrolyte und Nanopartikelbildung
 Colloquium in honor of the 80th birthday of Prof. B. Philipp, Teltow-Seehof,
 11 February, 2005

J. Koetz
 Polymers in self-assembled multicomponent systems

International Conference on Advances in Polymer Blends, Composites, IPNS and Gels: Macro to Nano Scales, Kottayam, Kerala, India, 21 March, 2005

J. Koetz

Von der Alchemie zur Nanotechnologie

Kolloquium SKW Piesteritz, Wittenberg, 21 September, 2005

J. Koetz, S. Kosmella, B. Tiersch, J. Bahnemann

Recovery of nanoparticles produced in polymer-modified microemulsions

Formula IV: Frontiers in Formulation Science, London, UK, 6 July, 2005

J. Koetz, Q. Tong

Nanoparticle formation in smart polyelectrolyte-modified liquid crystals

42nd Meeting of the German Colloid Society, Aachen, 26 September, 2005

A. Köhler

Energetics and dynamics of triplet states in conjugated polymers

Gordon Research Conference, Rhode Island, USA, 2005

A. Köhler

Morphology dependence of singlet energy transfer and triplet exciton formation in polyfluorene

8th European Conference on Molecular Electronics, Bologna, Italy, 2005

A. Köhler

Time-resolved and steady-state optical spectroscopy in conjugated polymers,

16th European Symposium on Polymer Spectroscopy (ESOPS), Kerkrade,

The Netherlands, 2005

G. Koßmehl

Die Welt der schönen Düfte

Stadthalle Erkner, 20 April, 2005

G. Koßmehl, H.-P. Welzel

Experimentarium

Carl-Bechstein-Gymnasium, Erkner, 25 April, 2005

S. Kudaibergenov, Z. Ibraeva, L. Bimendina, M. Hahn, W. Jaeger, A. Laschewsky, S. Yeroshina, N. Ibraev

Solutions, Complexes, Langmuir-Blodgett Films and Gels of Synthetic Polyampholytes

European Polymer Congress 2005, Moscow, Russia, 27 June - 1 July, 2005

A. Laschewsky

EU-Forschungsprojekt MIRO - Micro-Incision Research in Ophthalmology

ACRIMED Wissenschaftliches Kolloquium, Berlin, 24 September, 2005

A. Laschewsky

Polymerisation in ionischen Flüssigkeiten
Kolloquium des Berlin-Brandenburgischen Verbands für Polymerforschung 2005,
Humboldt-Universität zu Berlin, 28 October, 2005

A. Laschewsky, S. Garnier, M. Mertoglu, K. Skrabania, J. Storsberg
Synthesis and Self-organization of Multiple Stimuli Responsive Amphiphilic Polymers
in Aqueous Media
79th ACS Colloid and Surface Science Symposium, Clarkson University,
Potsdam NY, USA, 12-15 June, 2005

A. Laschewsky, V. Strehmel
Free Radical Polymerization of Methacrylates in Ionic Liquids
Université de Montréal, Québec, Canada, 16 June, 2005

A. Laschewsky, V. Strehmel
Polymérisation radicalaire de monomères méthacryliques dans les sels fondus
Institut Charles Sadron CNRS, Strasbourg, France, 23 February, 2005

A. Lendlein
Biodegradable Polymers with Shape-memory Effect
1st Jointed German-Japanese Conference on Regenerative Medicine, Tsu/Mie,
Japan, 10 September, 2005

A. Lendlein
Bio-Engineering technology platform for regenerative therapies
BCRT-Begutachtung zur Einrichtung eines DFG-Forschungszentrums, Bonn,
23 June, 2005

A. Lendlein
Biomaterials in Regenerative Medicine
Regenerative Medicine, IZKF Workshop, Meissen, 18 March, 2005

A. Lendlein
Formgedächtnis - Polymere als Beispiel für ein multifunktionalisiertes
Materialsystem
Institut für Werkstoffe, Sonderforschungsbereich 459, Bochum, 18 January, 2005

A. Lendlein
Formgedächtnismaterialien für die Chirurgie
Monday-Morning Lecture, Fortbildungsveranstaltung, Berlin, 31 January, 2005

A. Lendlein
Formgedächtnismaterialien in der Chirurgie
Vortrag an der Charité, Berlin, 26 October, 2005

A. Lendlein
Gründen aus einer Forschungseinrichtung - Erfahrungen aus der Praxis
Finanzierung für Forschungsgruppen und Gründer - Das BMBF-Programm
ExistGo-Bio und der HighTech Gründerfonds, Potsdam, 14 December, 2005

A. Lendlein

Intelligente Biomaterialien und deren Anwendungspotential in der Medizin
Kongress Innere Medizin, Wiesbaden, 4 April, 2005

A. Lendlein
Kunststoffe als Implantatmaterialien. Konzepte für (Multi-) Funktionale Materialien
Institutsseminar, Reutlingen, 4 July, 2005

A. Lendlein
Maßgeschneiderte, intelligente Polymersysteme für den Einsatz in der
minimalinvasiven Medizin
BMBF-Wettbewerb BioFuture, Berlin, 31 January, 2005

A. Lendlein
(Multi-) Funktionale Materialien und deren Innovationsmaterial in der Medizin
Quo vadis Chirurgia 2005, München, 28 January, 2005

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(Multi-) Funktionale Materialsysteme für Anwendungen in der Medizin
Fachverband Biomedizinische Technik, Würzburger Medizintechnik Kongress,
Würzburg, 9 May, 2005

A. Lendlein
(Multi-) Funktionale Polymere
WING-Konferenz, Aachen, 10 November, 2005

A. Lendlein
Multifunctional Materials for Membranes and Scaffolds
Symposium, Evangelische Akademie Schloss Tutzing, Tutzing, 21 November, 2005

A. Lendlein
Multifunktionale Biomaterialien
Interventionelle Neuroradiologie, Symposium Charité Campus Benjamin Franklin,
Berlin, 16 April, 2005

A. Lendlein
Multifunktionale Implantatmaterialien
Herbst-Kolloquium SFB 599 „Zukunftsfähige bioresorbierbare und permanente
Implantate aus metallischen und keramischen Werkstoffen“, Hannover,
4 November, 2005

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Multifunktionale Polymersysteme für Anwendungen in der Medizin
GDCh-Fachgruppe "Makromolekulare Chemie", Bayreuth, 14 July, 2005

A. Lendlein
Polymeric Biomaterials for Long-Term Implantation
HERAEUS Workshop - Medicine Technology, Hanau, 2 May, 2005

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Polymeric Biomaterials in Regenerative Medicine
2nd World Congress on Regenerative Medicine, Leipzig, 19 May, 2005

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Regenerative Medizin, derzeitige Arbeitsschwerpunkte und Vorschläge für die Konzeption des Programms Regenerative Medizin für die zweite Programmperiode
Zukunft der Regenerativen Medizin in der Helmholtz Gemeinschaft, Workshop,
Berlin, 21 March, 2005

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Regenerative Medizin in der Helmholtz-Gemeinschaft
Biotechnica 2005, Hannover, 18 October, 2005

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Shape-memory Effects in Polymers Applied to Medical Devices
The Medical Device Technology 2005, Birmingham, UK, 16-17 February, 2005

A. Lendlein
Shape-memory effects in polymer networks for medical application
MRS Fall Meeting 2005, Boston, MA, USA, 29 November, 2005

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Stimuli-Sensitive Biomaterial System for Regenerative Medicine
BIOSURF - Tissue-Surface-Interaction, Lausanne, Switzerland, 22 September, 2005

A. Lendlein
Workshop „Stem Cell Research in Korea and Germany“
B.-B. 's Life Science Cluster meets Asia, Berlin, 27 September, 2005

A. Lendlein, S. Kelch
Multifunctional Polymer Systems Designed for Biomedical Applications
Euro Nano Forum 2005, Edinburgh, UK, 7 September, 2005

A. Mellinger, F. Camacho González, R. Singh, R. Gerhard-Multhaupt
Studying deep-level charge trapping in electret polymers: a combined electrical, optical and thermal approach
16th European Symposium on Polymer Spectroscopy, Rolduc Abbey, Kerkrade, The Netherlands, May 2005

A. Mellinger, R. Singh, M. Wegener, W. Wirges, R. Flores Suárez, R. Gerhard-Multhaupt, S.B. Lang, L.F. Santos
High-resolution three-dimensional space-charge polarization mapping with thermal pulses
12th Int. Symposium on Electrets, Salvador, Brazil, September 2005

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Three-dimensional mapping of polarization profiles in ferroelectric polymers with thermal pulses
69. Jahrestagung der Deutschen Physikalischen Gesellschaft, Berlin, 4-9 March, 2005

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Three-dimensional pyroelectric microscopy in poly(vinylidene fluoride) films and sensor cables

11th Int. Meeting on Ferroelectricity, Iguassu Falls, Brazil, September 2005

D. Neher

Approaching the quantum limit with polymer electrophosphorescent devices

DPG Frühjahrstagung, Berlin, 4-9 March, 2005

D. Neher

Approaching the quantum limit with polymer electrophosphorescent devices

ECOER 05, Winterthur, Switzerland, 26-30 September, 2005

D. Neher

Mikroskopischer und makroskopischer Transport in P3HT Schichten

DFG Schwerpunktseminar, Würzburg, 3-4 October, 2005

D. Neher (with K. Bonrad, Merck)

OLEDs for signage and ambient lightning

Plastic Electronics, Frankfurt, 4-5 October, 2005

D. Neher

Phosphoreszente Polymer LEDs

Seminar zu aktuellen Trends in der OLED Technologie, IAPP, TU Dresden,

4 March, 2005

D. Neher

Towards an improved morphology control of bulk heterojunction materials

2nd International Symposium on Complex Materials, Stuttgart, 2-3 June, 2005

J.P. Rabe

Assembly, Manipulation and Properties of Molecular Nanocomposites on Solid Substrates

Gordon Research Conference on Ion-Containing Polymers, Il Ciocco, Italy, 1-6 May, 2005

J.P. Rabe

Assembly, Manipulation and Properties of Molecular Nanocomposites on Solid Substrates

Materialdepartment-Kolloquium, ETH Zurich, Switzerland, 25 May, 2005

J.P. Rabe

Atomic Force Microscopy and Scanning Tunneling Microscopy in Material Science: Fundamentals and Applications

Politecnico, Milan, Italy, 24 November, 2005

J.P. Rabe

Electronics with single molecules: Electron transport through monomolecular diodes, single molecular stacks, and a prototypical transistor

EMPA, Dübendorf, Switzerland, 16 June, 2005

J.P. Rabe

Electronics with single molecules: Electron transport through monomolecular

diodes, single molecular stacks, and a prototypical transistor
ECME 8, Bologna, 29 June - 2 July, 2005

J.P. Rabe

Große Moleküle und kleine Funktionselemente - Der Ein-Molekül-Transistor
Physikalisches Kolloquium, Humboldt-Universität zu Berlin, 18 January, 2005

J.P. Rabe

Imaging and Manipulation of Macromolecules on Surfaces
Department of Chemistry, ETH Zurich, Switzerland, 22 June, 2005

J.P. Rabe

Manipulation of Single Macromolecules on Solid Substrates
Bayreuther Polymer Symposium, Bayreuth, 18-20 September, 2005

J.P. Rabe

Manipulation of single macromolecules on solid substrates
Center for Nanoscience, Ludwig-Maximilians-Universität, München,
25 November, 2005

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Moving, Bending and Stretching Single Macromolecules at Surfaces
10th Dresden Polymer Discussion, Meißen, 10-13 April, 2005

J.P. Rabe

Scanning Probe Microscopies for the Characterization of Polymers
Laboratory for Polymer Chemistry, ETH Zurich, Switzerland, 10 May, 2005

J.P. Rabe

Von großen Molekülen und kleinen Funktionselementen - Experimente mit einzelnen
Makromolekülen auf Festkörperoberflächen
Physikalisches Kolloquium, Universität Ilmenau, 4 January, 2005

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Makromolekülen auf Festkörperoberflächen
Physikalisches Kolloquium, Universität zu Köln, 11 January, 2005

J.P. Rabe

Workbench for single macromolecules and monomolecular electronic devices
Pacifichem 2005, Honolulu, USA, 15-20 December, 2005

K.-H. Reichert

Katalysatorpartikel während der Olefinpolymerisation
Hamburg, October 2005

K.-H. Reichert

Perspektiven der Polymersationstechnik
Schkopau, June 2005

D. Rickert, M. Scheithauer, S. Kelch, R.-P. Franke, A. Lendlein

Erste Ergebnisse zum Einsatz eines abbaubaren, elastomeren Polymers zur

Mukosarekonstruktion im Tiermodell
Symposium Biomaterialien in der Hals-Nasen-Ohrenheilkunde, Rostock,
23-24 September, 2005

V.-H. Rolon-Garrido, M.H. Wagner
Branched Polyethylenes Submitted to Exponential Shear Flow in Cone-and-Plate and
Parallel-Plate Geometries
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France, 19-25 April, 2005

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M. Samoc, A. Samoc, B. Luther-Davies, I. Diez, B. Schulz
Cubic nonlinear optical properties of π -conjugated polymers from reflection-mode
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Mexico, 22-28 April, 2005

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Structural characterization of physisorbed nitrogen films in periodic mesoporous
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B. Schulz, Ch. Xü
Supramoleculär architecture of organics - the fascinating contribution of oxadiazole
compounds
Bilateral Symposium on Heterocyclic and Heterochain Polymers for High Performance
Applications, Iasi, Romania, 6-12 June, 2005

B. Schulz, I. Diez
The chemical template syntheses of polypyrrole - a new way to nanoparticles with
controlled shape
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B. Seifert, A. Kostadinova, W. Albrecht, T. Groth, G. Altankov, A. Lendlein
Membranes made of P(AN/AMPS) copolymers for the patocyte cultivation
in bioreactors
Engineering with Membranes 2005 - Medical and biological applications,
Camogli, Italy, 15-18 May, 2005

B. Seifert, M. Zierke, S. Kelch, A. Lendlein
Evaluation of Biodegradable Multi-Block Polymers in Contact with Endothelium
and Blood
19th European Conference on Biomaterials, Sorrento, Italy, 11-15 September, 2005

R. Steitz, S. Schemmel, G.H. Findenegg
Boundary layers of water at polymer/liquid interfaces

Bunsentagung, Frankfurt/Main, 5-7 May, 2005

J. Storsberg, E. Görnitz, A. Laschewsky

Eine neue Klasse von hydrophoben Acrylmaterialien: Neue Polymerwerkstoffe für faltbare Intraokularlinsen und andere Anwendungen in der Ophthalmochirurgie
1. Expertentag Bonn, Hochkreuz Augenklinik, 16 December, 2005

J. Storsberg, A. Laschewsky, S. Garnier, K. Skrabania

Polymer Surfactants - Novel Agents with Exceptional Properties
52nd SEPAWA-Congress 2005 + 1st European Detergency Conference, Würzburg,
12-14 October, 2005

J. Storsberg, W.G.K. Müller-Lierheim, E. Görnitz, A. Laschewsky

Chemical Design of Ophthalmic Implants
BMT 2005 39th Annual Congress of the German Society for Biomedical Engineering,
14-17 September, 2005

V. Strehmel, A. Laschewsky, R. Stößer, A. Zehl, W. Herrmann

Neue Anwendungen für ESR-Spinsonden - Polymerisation in ionischen Flüssigkeiten
104. Hauptversammlung der Deutschen Bunsen-Gesellschaft für Physikalische
Chemie e.V., Frankfurt a.M., 5-7 May, 2005

M.H. Wagner

Elongational Viscosity of Monodisperse Polystyrene Melts - A Constitutive Analysis
CECAM Workshop: Modeling & Simulation of Entangled Polymeric Liquids, Lyon,
France, 17-21 July, 2005

M.H. Wagner

Modeling Elongational and Shear Rheology of Nearly Monodisperse
Polystyrene Melts
Tagung Schweizer Rheologiegruppe-PGS Zürich, Switzerland, 20-23 October, 2005

M.H. Wagner

Modeling Elongational Viscosity of Blends of Linear and Long-chain
Branched Polypropylene
21st Annual Meeting of the Polymer Processing Society (PPS-21), Leipzig,
18-23 June, 2005

M.H. Wagner

Non-linear Constitutive Equations
RPK Utrecht, Netherlands
1-5 March, 2005

M.H. Wagner

Quantitative Prediction of Transient and Steady-State Elongational Viscosity
of Monodisperse Polystyrene Melts
Conference on „Extensional Flow“, University of Wales, Lake Vyrnwy, UK,
18-23 March, 2005

M.H. Wagner

Rheologie von Polymerschmelzen - Einsichten und Aussichten

BASF AG, Ludwigshafen, 18-21 September, 2005

M.H. Wagner

Rheologische Modelle für lineare und langkettenverzweigte Polymerschmelzen
Hamburger Makromolekulares Symposium, Universität Hamburg,
10-12 October, 2005

M.H. Wagner

Shear and elongational rheology of LLDPE/LDPE blends
21st Annual Meeting of the Polymer Processing Society (PPS-21), Leipzig,
18-23 June, 2005

M.H. Wagner

The Rheotens Test - a Prototype Industrial Flow
DRG-Workshop: Rheology and Processing of Polymers, Leipzig, 19 June, 2005

L. Wattebled, A. Laschewsky

Kationische dimere Tenside
Vortragsveranstaltung SEPAWA e.V., Landesgruppe Ost, Fraunhofer IAP,
Potsdam-Golm, 22 April, 2005

M. Wegener, S. Bergweiler, O. Voronina, W. Wirges, R. Gerhard-Multhaupt
Stacks of piezoelectric cellular polypropylene films: Characterisation of audio
and ultrasound transducer properties
69. Jahrestagung der Deutschen Physikalischen Gesellschaft, Berlin, 4-9 March,
2005

M. Wegener, R. Gerhard-Multhaupt

Electrically charged non-polar polymer foams as ferroic materials
2005 Workshop on Fundamental Physics of Ferroelectricity, Williamsburg, USA,
6-9 February, 2005

M. Wegener, A. Mellinger, W. Wirges, R. Gerhard-Multhaupt

Ferroelectrets: Electrically charged polymer foams as ferroic materials
11th Int. Meeting on Ferroelectricity (IMF), Iguassu, Brazil, 1-3 September, 2005

M. Wegener, A. Mellinger, W. Wirges, R. R. Mallepally, R. Gerhard-Multhaupt
Ferroelectret cellular propylene films: Piezoelectric properties and thermal and
temporal stability

2nd Int. Workshop on Piezoelectric Materials and Applications in Actuators,
Paderborn, May 2005

M. Wegener, W. Wirges, A. Mellinger, M. Winkler, R. Gerhard-Multhaupt

Ferroelectrets: Adjustment of Electric, Elastic and Piezoelectric Properties by
Means of Foam-Structure Modification
12th Int. Symposium on Electrets, Salvador, Brazil, September 2005

Th. Weigel, F. Klein, A. Lendlein, U. Marx

Kontinuierliche Herstellung mikroporöser Membranstrukturen durch
Schaumextrusion mit superkritischen Kohlendioxid
DECHEMA-Arbeitsausschuss „Membrantechnik“, Frankfurt/Main, 19 January, 2005
H.-J. Ziegler, S. Kelch, A. Lendlein
Synthese und Eigenschaften von bioabbaubaren Formgedächtnispolymeren

Projekttreffen: Nano-Pulver als Antennen für extern stimulierbare Formgedächtnis-compounds als Nahtmaterial für die Medizin, Darmstadt, 23 November, 2005

Akram **Abdu** (M.H. Wagner)
Untersuchung des Röntgenkontrastes polymerer Implantate
Technische Universität Berlin

Hassan Khalil **Ajami** (M.H. Wagner)
Inbetriebnahme eines Göttfert-Rheometers und Anfertigung von Fließkurven von
Polypropylen
Technische Universität Berlin

Mundar Saleh Said **Al-Rawahi** (M.H. Wagner)
Processing of Polypropylene and Investigation of Material Properties Related to
Processing
Technische Universität Berlin

Georgios **Athanasiadis** (M.H. Wagner)
Konstruktion eines Meereswellenenergiewandlers mit verstärktem Einsatz von
Kunststoffen
Technische Universität Berlin

El Mustapha **Baira** (M.H. Wagner)
Konstruktion und Bau von Werkzeugeinsätzen für eine Vakuumpressanlage für
Kunstharze
Technische Universität Berlin

Halil Benli **Bastas** (M.H. Wagner)
Untersuchung des Einflusses von Röntgenkontrastmitteln auf die mechanischen
Eigenschaften polymerer Implantate
Technische Universität Berlin

Fabian **Baumann** (M.H. Wagner)
Machbarkeitsstudie über die Herstellbarkeit von reißbaren Dekorelementen zur
Anwendung auf Airbagkappen
Technische Universität Berlin

Dirk **Bunkowitz** (M.H. Wagner)
Entwurf und Konstruktion eines tribologischen Prüfstandes für beschichtete
Kunststoffzahnräder
Technische Universität Berlin

Nizar **Chebil** (M.H. Wagner)
Konstruktion und Bau einer Vakuumpressanlage
Technische Universität Berlin

Arne **Dinse** (K.-H. Reichert)
Hydrotalcit Katalysatoren für die Synthese von Polyethylenterephthalat
Technische Universität Berlin

Ingo **Dönch** (H. Möhwald)
Rasterkraftmikroskopie und Polyelektrolyt Multilagen
Freie Universität Berlin

Rosaura **Flores Suárez** (R. Gerhard-Multhaupt, A. Mellinger)
Polarization profiles in poled PVDF sensor cables
Universität Potsdam

Fabian **Grasse** (M.H. Wagner)
Konstruktion und Bau einer Stanzvorrichtung zur Anfertigung von Prüfkörpern aus flächigen Kunststoffprodukten für mechanische Untersuchungen
Technische Universität Berlin

Glen Boy **Handoyo** (M.H. Wagner)
Konstruktion eines Spiralwerkzeuges mit Wechseleinsätzen zur Untersuchung der Fließfähigkeit von Thermoplastschmelzen
Technische Universität Berlin

A. **Jäschke** (A. Lendlein)
Bewertung des Sauerstoffeintrags von Hohlmembranen unterschiedlicher Morphologie
Fachhochschule für Technik und Wirtschaft Berlin

Christina **Leinweber** (H. Möhwald)
Droplet formation in microstructured porous polymeric materials
Universität Potsdam

Ali **Mokdad** (M.H. Wagner)
Inbetriebnahme eines Göttfert-Rheometers und Anfertigung von Fließkurven von verschiedenen Polyethylenen
Technische Universität Berlin

Katrin **Möws** (R. Haag)
Polymere Wirkstoff-Nanotransporter auf der Basis von dendritischen Polyglycerin-Amphiphilen
Freie Universität Berlin

Tarig Saeed **Muhammed** (M.H. Wagner)
Entwicklung und Konstruktion eines Wasserfiltersystems zur mechanischen Reinigung von verschmutztem Trinkwasser
Technische Universität Berlin

Rachid **Nagib** (M.H. Wagner)
Simulation von thermischer Ausdehnung und von Wärmespannungen an Kunststoffteilen mit FEM (ANSYS) am Beispiel eines idealisierten Automobilstoßfängers
Technische Universität Berlin

Pantea **Nazaran** (H. Möhwald)
Mobility of polyelectrolyte multilayer: Influence of external stimuli
Universität Potsdam

Anke **Oertel** (J. Koetz)
Abtrennung und Aufkonzentration von polymerstabilisierten Nanopartikeln
Universität Potsdam

Julia **Orlik** (M.H. Wagner)

Herstellung, spektroskopische Charakterisierung und Applikationserprobung orientierter PVDF-Folien und darauf basierender piezoelektrischer Polymersensoren
Technische Universität Berlin

Elizabeth Lekha **Paul** (D. Neher)

Polyfluorene blend nanoparticles for solar cell devices
Universität Potsdam

Tong **Qiong** (J. Koetz)

Charakterisierung der polymerinduzierten bikontinuierlichen PVP/Pentanol/Xylen/SDS/Wasser-Phase
Universität Potsdam

Romy **Regensburger** (J. Koetz)

Nanocasting in konzentrierten Polyanion-Polykation Systemen
Universität Potsdam

Yvonne **Röstel** (M.H. Wagner)

Analyse und Optimierung einer Montage- und Ultraschallschweißanlage hinsichtlich der Teilezuführung und Schweißqualität
Technische Universität Berlin

Flavie **Salles** (A. Laschewsky)

Use of Fluorescently Labelled Initiators or Chain Transfer Agents in Radical Polymerization for End-Group Analysis
Universität Potsdam und ENSCM Montpellier, France

Dorothee **Silbernagel** (M.H. Wagner)

Preparation and Studies of Spin Coated Polymeric Thin Films
Technische Universität Berlin

Mehran **Taherkhani** (G.H. Findenegg)

Herstellung von SBA-15 Silika und Charakterisierung der Porenstruktur mittels Gasadsorption und Röntgenkleinwinkelstreuung
Technische Universität Berlin

Wuiwui Chauhari **Tjju** (G.H. Findenegg)

Micellization of Amphiphilic Block Copolymers Capable of Hydrogen Bonding
Technische Universität Berlin

A. **Weiß** (A. Lendlein)

Untersuchung zum Einfluss der Pressure-Quench-Verfahrensparameter auf die Schaumstoffmorphologie von Scaffolds aus Polycaprolacton für das Tissue Engineering
Technische Universität Berlin

Chunhong **Yin** (D. Neher)

PPV Polymer Based Bulk Heterojunction Photovoltaic Cells
Universität Potsdam

Hamid Naghib **Zadeh** (M.H. Wagner)
Untersuchungen zur Korrosionsbeständigkeit von HTSL-Schichten
Technische Universität Berlin

Mohammad **Abboud** (K.-H. Reichert)
Video Microscopy Studies on Growth Kinetics of Single Catalyst Particles during
Olefin Polymerization
Technische Universität Berlin

Abu Md. Imroz **Ali** (M. Antonietti)
Morphology Control in Nanoscopic Composite Polymer Particles
Universität Potsdam und MPI KG

Torsten **Brezesinski** (M. Antonietti)
Herstellung und Charakterisierung funktioneller mesostrukturierter Metalloxidfilme
Universität Potsdam und MPI KG

Isabel Marie **Diez San Jose** (B. Schulz, K.-D. Tauer)
Shaping of conductive polypyrrole during polymerization
Universität Potsdam und MPI KG

Hongwei **Duan** (H. Möhwald)
Functional Nanoparticles as Self-Assembling Building Blocks and Synthetic Templates
Universität Potsdam

Doreen **Eckhardt** (M. Antonietti)
Rationales Design von Oligopeptid-Organisatoren zur Bildung von nanostrukturierten
Polyethylenoxid-Fasern
Universität Potsdam und MPI KG

Nils **Elsner** (H. Möhwald)
Nanomechanik und Adhäsion von Polyelektrolytmultischicht-Hohlkapseln
Universität Potsdam

Georg **Garnweitner** (M. Antonietti)
Nonaqueous Synthesis of Transition Metal Oxide Nanoparticles and Their
Formation Mechanism
Universität Potsdam und MPI KG

Matthijs **Groenewolt** (M. Antonietti)
Nanostrukturierte Materialien durch Neue Templatsysteme und Nutzung
mesoporöser Silikate als Nano-Reaktoren
Universität Potsdam und MPI KG

Axel **Hentrich** (M.H. Wagner, P. Ewert)
Herstellung von polymeren Stents als Drug Delivery Systeme durch Tauchen
aus der Polymerlösung
Technische Universität Berlin

Martin **Hetschel** (M.H. Wagner, A. Burr)
Abformung von Nanostrukturen im Spritzgießverfahren zur Erzeugung von
Antireflexoberflächen
Technische Universität Berlin

Christian **Holtze** (M. Antonietti)
Neue Einflüsse und Anwendungen von Mikrowellenstrahlung auf Miniemulsionen
und ihre Kompositpolymere

Universität Potsdam und MPI KG

Justyna **Justynska** (M. Antonietti)

Towards a Library of Functional Block Copolymers - Synthesis and Colloidal Properties
Universität Potsdam und MPI KG

Eiad **Kabaha** (M.H. Wagner, W. Mielke)

Kleinprüfstäbe zur Charakterisierung der mechanischen Eigenschaften
thermoplastischer Polymere
Technische Universität Berlin

Saeid **Kheirandisch** (M.H. Wagner, W. Mielke)

Constitutive Equations for Linear and Long-Chain-Branched Polymer Melts
Technische Universität Berlin

Thomas **Kietzke** (D. Neher)

Solar cells based on novel nanostructured blends of semiconducting polymers
Universität Potsdam

Steffen **Kozempel** (M. Antonietti)

Emulgatorfreie Emulsionspolymerisation - Monomerlösungszustand und
Teilchenbildung
Universität Potsdam und MPI KG

Stephan **Kubowicz** (H. Möhwald)

Design and Characterization of Multicompartment Micelles in Aqueous Solution
Universität Potsdam

Elena **Maltseva** (H. Möhwald)

Model membrane interactions with ions and peptides at the air/water interface
Universität Potsdam

Murat **Mertoglu** (A. Laschewsky)

The Synthesis of Well-Defined Functional Homo- and Block Copolymers in Aqueous
Media via Reversible Addition-Fragmentation Chain Transfer (RAFT) Polymerization
Universität Potsdam and Fraunhofer IAP

Samira **Nozari** (M. Antonietti)

Towards Understanding RAFT Aqueous Heterophase Polymerization
Universität Potsdam und MPI KG

Umut **Oran** (M. Hennecke)

Surface Chemical Characterization of Plasma-Chemically Deposited Polymer Films
by Time-of-flight Static Secondary Ion Mass Spectroscopy
Freie Universität Berlin und BAM

Julien **Polleux** (M. Antonietti)

Ligand-Mediated Synthesis and Assembly of Crystalline Metal Oxide Nanoparticles
Universität Potsdam und MPI KG

Sylvia **Reinhardt** (G.H. Findenegg)

Herstellung und Modifizierung maßgeschneiderter Adsorberpolymere für die Reinigung
von Abwässern und Abluft

Technische Universität Berlin

Nathalie **Sieverling** (H. Möhwald)
Kationische Copolymere für den rezeptvermittelten Gentransfer
Universität Potsdam

Alexandra **Steffens** (J. Springer, H. Schumann)
Erdalkalimetallkomplexe zur Polymerisation polarer Monomere
Technische Universität Berlin

Sufal **Swaraj** (M. Hennecke)
Surface Chemical Characterization of Plasma-Chemically Deposited Polymer Films
by X-ray Photoelectron Spectroscopy and Near Edge X-ray Absorption Fine Structure
Freie Universität Berlin und BAM

Geraldine **Theiler** (M.H. Wagner, K. Friedrich)
PTFE- and PEEK-Matrix Composites for Tribological Applications at Cryogenic
Temperatures and in Hydrogen
Technische Universität Berlin

Rebecca **Voß** (M. Antonietti)
Mesoporous organosilica materials with aminefunctions: surface characteristics and
chirality
Universität Potsdam und MPI KG

Dr. Axel **Mellinger** (R. Gerhard-Multhaupt)
Charge Storage in Electret Polymers: Mechanism, Characterization and Applications
Universität Potsdam

Patents

H. Ebeling, H.-P. Fink, M. Doss
Vliesstoffe und ein Verfahren zu deren Herstellung sowie deren Verwendung
AZ 10 2005 029 793.5, Anmeldetag 27.06.2005

J. Gensrich, H.-P. Fink, G. Weidel
Membran für die Blutdetoxifikation, Verfahren zu deren Herstellung sowie deren
Verwendung
WO 2005/110585

R. Haag, M. Radowski
Multischalen Wirkstoff-Nanotransporter
PCT-Anmeldung, 2005

W. Jaeger, A. Laschewsky, B. Paulke, S. Schwarz, K. Lunkwitz
Verfahren zur Abtrennung suspendierter Feststoffe aus wässrigen Systemen mit
ionischen polymeren Flockungsmitteln
AZ 10 2005 009 809.6, Anmeldetag 03.03.2005

J. Koetz, V. Abetz, S. Andres
Nanohohlkapseln
AZ 10 2005 035 374.6-43, Anmeldetag 22.07.2005

R. Mach, H.-E. Maneck, J. Friedrich
Verfahren und Plasmatron zur Herstellung eines modifizierten Materials
Anmeldenummer D-OS 10 2004 002 236 A1(2005)

M. Pinnow, H.-P. Fink
Verfahren zur Bestimmung von Kennwerten und/oder der Homogenität einer
offenporigen Materialschicht
PCT/DE 2005/0011855, Anmeldetag 18.10.2005

C. Przybyla, O. Struck, A. Laschewsky, B. Paulke, M. Hahn
Process for preparing a polymer dispersion and a polymer
European Patent Application 05445036.6, Anmeldetag 20.05.2005

J. Storsberg, E. Görnitz, A. Laschewsky, E. Winter, W. Müller-Lierheim
Polymerzusammensetzung mit hohem Brechungsindex
European Patent Application 05026265.6, Anmeldetag 01.12.2005

W. Müller-Lierheim, E. Winter, J. Storsberg, E. Görnitz, A. Laschewsky
Schwefelhaltige Monomere mit hohem Brechungsindex, deren Homo- und
Copolymerisate, sowie deren Verwendung in optischen Elementen
European Patent Application, 05026266.6, Anmeldetag 01.12.2005

Awards

M. Hennecke

Election as chairman of the working group of the German federal research institutes (AG Ressortforschung)

M. Hennecke

Election as member of acatech-Konvent für Technikwissenschaften der Union der deutschen Akademien der Wissenschaften

M. Hennecke

Election as vice president of the German institute for standardization (DIN)

A. Lendlein

World Technology Network Award, Category Health&Medicine, San Francisco, USA

Some lectures were held as part of the Master of Science in Polymer Science curriculum of the FU Berlin, HU Berlin, TU Berlin, and U Potsdam. They are indicated by MSPS.

Freie Universität Berlin

Sommersemester 2005

Physikalische Chemie der Polymeren II 1 V	Hennecke
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Wintersemester 2005/2006

Advanced Topics of Polymer Synthesis MSPS 3 V	Hennecke
Introduction to Macromolecular Chemistry MSPS 3 V	Haag
Methods in Polymer Synthesis MSPS 3 V	Haag
Physikalische Chemie der Polymeren I 1 V	Hennecke
Short Course in Physical Chemistry of Polymers MSPS 1 V	Hennecke

Sommersemester 2005

Keine Angaben

Wintersemester 2005/2006

Biophysik im Überblick 2 V	Hermann Rabe
Kolloquium zur Makromolekül- und Vielteilchenphysik 2 SE	Rabe Röder Sokolov Schimansky-Geyer
Polymer Characterization MSPS 4 V, 2 SE, 8 PR	Rabe Kirstein Severin Koch Barner Jäckel Zhuang

Sommersemester 2005

Konstruieren mit Kunststoffen II 2 V, 2 UE	Wagner Müller
Kunststoffprüfung 2 V	Mielke Hentschel
Kunststoffrecycling 2 V	Wagner Tartakowska
Kunststoffverarbeitung II 2 V, 4 PR	Wagner Rautenberg
Messtechnische Übungen 2 PR	Wagner Rautenberg
Physikalische Eigenschaften der Kunststoffe 2 V, 1,5 UE + PR	H. Springer Wagner
Polymer Testing 2 V	Mielke Hentschel
Polymerspektroskopie 2 V	Friedrich
Polymerwissenschaftliches Seminar	Wagner Rautenberg H. Springer
Rheologie der Polymerschmelzen I 2 V, 2 PR	Wagner
Spektroskopie 2 V	Friedrich
Surface Science of Polymers 2 V, 2 UE	Findenegg

Wintersemester 2005/2006

Current Topics of Colloid and Interface Science 2 V, 1 SE	Findenegg Gradzielski Hellweg
Kunststoffverarbeitung I 2 V, 4 PR	Wagner Rautenberg
Messtechnische Übungen 2 PR	Wagner Rautenberg
Modul Prozesstechnik für Werstoffwissenschaften: Rheologie 2 V	Wagner
Polymerwissenschaftliches Seminar 2 SE	Wagner Rautenberg H. Springer

Sommersemester 2005

Biopolymer and Colloidal Laboratory MSPS 4 P	Koetz Kosmalla Tiersch
Colloidal Phenomena MSPS 2 V	Koetz Antonietti
Electrical and Optical Properties Laboratory MSPS 4 PR	Gerhard-Multhaupt Neher
Festkörper und Nanostrukturen II 2 V, 1 UE	Gerhard-Multhaupt
Introduction into Nanotechnology 2 V	Schulz
Kolloidchemie II 2 V, 1 SE	Koetz Kosmella
Organic Semiconductors (Soft Matter Physics) 2 V	Neher
Organische Chemie für Biologen 2 VL, 1 UE	Lendlein
Physical and Engineering Properties MSPS 4 V, 2 SE	Gerhard-Multhaupt Neher
Physikalische Chemie der Grenzflächen 2 V	Koetz Brezesinski
Polymerchemie I 2 V	Laschewsky Antonietti Strehmel
Polymer Chemistry MSPS 2 SE	Laschewsky Tauer
Polymers as high-tech materials 2 V	Schulz
Spezialpraktikum zur Kolloid- und Polymerchemie PR (4 Wochen)	Koetz Laschewsky Kosmella Strehmel
Spezialseminar zur Experimentalphysik 2 SE	Gerhard-Multhaupt Köhler Neher
Strukturbildung in kolloidalen Systemen 2 V	Koetz Antonietti

Wintersemester 2005/2006

Einführung in die Biomaterialien 2 V	Lendlein
Experimentalphysik I: Principles of Physics 2 V	Neher
Experimentalphysik III: Ausgewählte Gebiete der Physik 2 V	Köhler
Introduction into Nanotechnology 2 V	Schulz
Introduction to Soft Matter Physics 2 V	Fery Neher
Kolloidchemie I 2 V, 1 SE	Koetz Kosmella
Kondensierte Materie 2 V, 1 UE	Gerhard-Multhaupt Frübing
Materialwissenschaften I 1 V, 1 UE	Köhler Reiche
Modern Aspects of Colloid Science 2 V	Koetz Antonietti
Polymerchemie II 2 V	Antonietti Laschewsky Beuermann
Polymers as Building Blocks for Mesoscopic Structures 2 V	Laschewsky Lutz
Polymers as high-tech materials 2 V	Schulz
Praktikum zur Kolloidchemie I und II 4 PR	Koetz Kosmella Tiersch
Praktikum zur Polymerchemie 4 PR	Laschewsky Strehmel Beuermann
Praktikum zur Polymerchemie für Chemiker PR (4 Wochen)	Laschewsky Strehmel
Spektroskopie und Moleküle 2 V, 1 UE	Gerhard-Multhaupt Mellinger
Spezialpraktikum zur Kolloid- und Polymerchemie PR (4 Wochen)	Koetz Kosmella
Spezialseminar zur Experimentalphysik 2 SE	Gerhard-Multhaupt Köhler Neher
Spezielle Aspekte der Polymersynthese 2 V	Laschewsky Strehmel Antonietti Beuermann
Technische Chemie I und II 2 V	Laschewsky