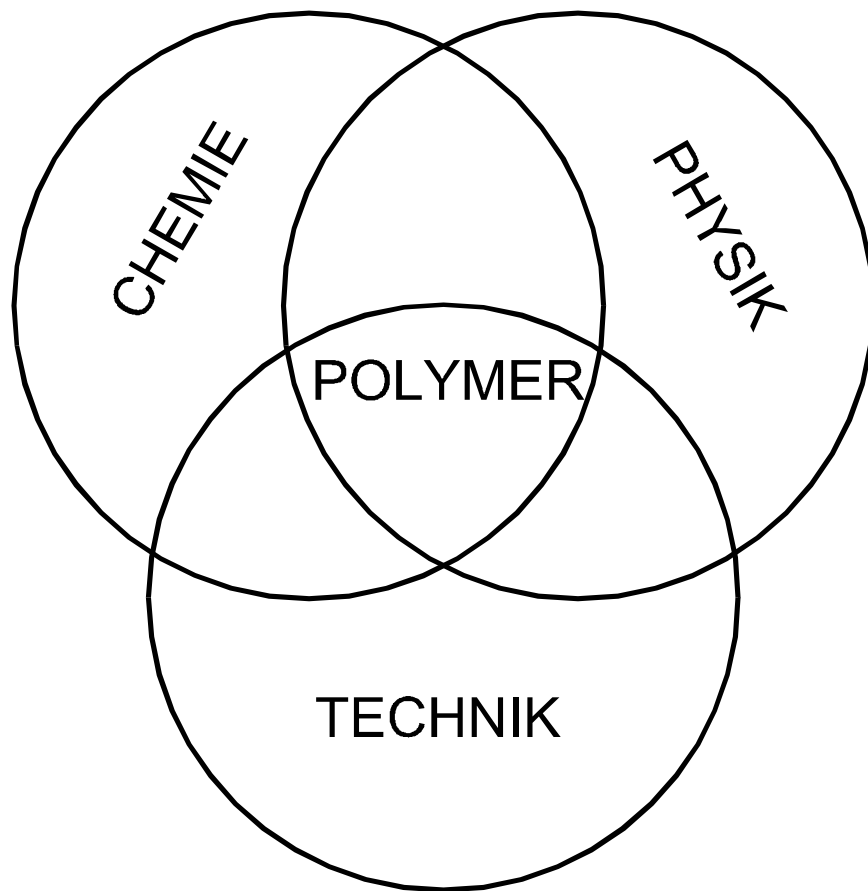


**Berlin-Brandenburgischer Verband
für Polymerforschung e.V.**



Scientific Report

Bericht über die wissenschaftlichen Aktivitäten

2004

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Preface

The 18th 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 member Andreas Lendlein, who is director of the Institute of Chemistry at the GKSS in Teltow-Seehof.

The former regular member Wolfgang Arlt who has accepted an offer from the University of Erlangen-Nürnberg has agreed to become a corresponding member of the BVP.

The former regular member Arnulf-Dieter Schlüter accepted a call from the ETH Zurich, Switzerland, and has also agreed to be 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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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

Prof. Dr. Ludwig Brehmer

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

The main topic of our research is the **”Solid State Physics of Functional Nano-Structured Organic Layers, Interfaces and supramolecular structures”** with the main parts:

- Molecular structuralised and functionalised supramolecular architectures
- Design and molecular modelling of supramolecular structures and materials
- Fabrication and characterisation of ultra thin layers on molecular level
- Construction, processes and interaction of supramolecular structures
- Electrical properties: charge transport, dc and ac measurements, dipole relaxations (impedance spectroscopy)
- Optical and NLO properties: UV-Vis and IR spectroscopy, ellipsometry, optical constants, SHG
- Separation processes (membranes)
- Theory of charge transport in disordered structures
- Application of specific interactions for microsensors (pyroelectricity, resistive humidity measurements, optical detection of metal ions)
- Nano-optics
- Nano-particle at organic surface
- Nano-photo science
- Molecular electronics (molecular switches, rectifier, interfaces)

Equipment for research and development:

- Fabrication of ordered film architectures:
 - Organic molecular beam deposition system (OMBD): with LEED, RHEED, MS, Auger spectroscopy-UHV-STM
 - Langmuir-Blodgett laboratory (clean room): BAM, Kelvin technique, alternating LB-technology
 - spin-coated device with Kern 1 and Kern 2 cleaning system and hot plate, self-assembling method
 - molecular modelling
 - film dipping system
- Structure characterization of ordered films:
 - X-ray diffractometry, UV-VIS and IR spectroscopy, microscopy (polarization, fluorescence), ellipsometry
 - interface rheology, ADSA technique
- Preparation of substrates and metalization:
 - evaporation and sputter devices, bonding machine, scribing machine, electron beam exposure

- Nano-lab (IGL Nano-optics):
 - AFM-atomic force microscope TMX2000 (Topometrix)
 - AFM/STM-atomic force microscope AUTOPROBE CP (Park Scientific)
 - AFM/STM-atomic force microscope UNIVERSAL (Park Scientific)
 - conducting-probe atomic force microscope CSM
 - SNOM: scanning nearfield optical Microscopy and AFM
 - SNEM: Scanning Nearfield Ellipsometrie Microscopy
- Electrical properties:
 - ac, dc, TSC, TSDC, pyroelectrical measuring station, impedance spectroscopy, CVC, Kelvin technique)
- Optical properties:
 - ellipsometry, grid coupler (wave guiding), plasmon microscopy, electroluminescence, NLO-ps stations, m-line station, thermoluminescence
- Thermal analysis:
 - Differential Scanning Calorimeter (DSC)
 - Thermal Gravimetrie Analyser (TGA)
- Utilization of large systems (DESY II, HASYLAB)
 - NEXAFS, synchrotron radiation, UPS
- Sensor laboratory:
 - gas mixing technique
 - humidity chamber

Selected main research topics

- Nano-photo science: optically induced switching processes (NLO, cascading)
- OLED: polarization, nanostructuring
- OFET: Organic Field Effect Transistors
- electro-optical effects
- charge transport in unordered systems (MC simulation, stochastic transport)
- membranes: modular ultrathin separation phases
- microsensors (humidity, IR)
- molecular electronics (switching, interface)
- NLO-effects and waveguiding

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 film 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 Dr. Werner Jaeger, Prof. André Laschewsky)

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

The new Fraunhofer pilot-plant center is situated in the Dow ValuePark in Schkopau in Sachsen-Anhalt. It will start operations in Spring 2005.

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

Equipment

Synthesis

- Solution polymerization
- Emulsion polymerization (continuous, batch)
- Bulk polymerization (batch, continuous)
- High viscosity technology (single-screw and twin-screw kneader)
- Gassing/Hydrogenating reactor

Processing

- Injection molding compounder KM 1300 - 14000 IMC, closing force 1.300 tons
- Synchronous parallel twin-screw extruders of different sizes
- Injection mold machine, closing force 200 tons
- Rheology measuring technology

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/>

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**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>

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**Bundesanstalt für Materialforschung und -prüfung
Division VI.3: Analysis and Structure of Polymers**

The following topics are investigated in a great number of internally and externally funded projects:

Certification and validation of polymers

- Emission of low-molecular weight substances from plastics and migration of additives in polymers (TOC, Headspace-GC, GC-MS, HPLC-MS, MSⁿ, Ion-trap MS, SPME technique etc.)
- Certification and testing of plastics in contact to foods and drinking water as well as investigations of damages in polymers and composites
- Aging / photodegradation of HALS stabilized polymers; migration of HALS

Macromolecular analysis; reference materials

- Characterization of polymers, especially evaluation and certification of polymer standards by application and development of reference methods (viscometry, osmometry, light scattering, SEC, high-temperature SEC, HPLC, SFC, IR- and UV-MALDI-TOF MS, Asymmetric and Thermal Field Flow Fractionation, NMR, FTIR)
- Chromatographic and spectroscopic characterization of copolymers (liquid adsorption chromatography under critical conditions-LACCC, 2D-HPLC)

Polymer surfaces; plasma technique, adhesion

- Analysis of polymer surfaces and thin polymer films (XPS, SFM/SPM, SEIRA, IRRAS, ATR, DRIFT, FTIR microscopy); orientation of macromolecules at surfaces (NEXAFS, GIR); preparation of monomolecular model films (Langmuir-Blodgett and Self-Assembling techniques)
- Functionalization of polymer surfaces by plasma treatment; deposition of thin homo and copolymer layers bearing functional groups of different type and density; syntheses and grafting at polymer surfaces; hydrophobic-hydrophilic 2D structures; wrapping of nanoparticles with functional groups and thin polymer layers
- Diagnostics of plasmas by self-excited electron resonance plasma spectroscopy in polymer-depositing plasmas; optical emission spectroscopy; probe and ion MS; hyphenating of plasma treatment and XPS surface analysis
- Characterization of interfaces; interfacial reactions in polymer composites; nanocomposites and metal-doped polymer layers; adhesion phenomena

Characterization of polymer solids

- Preparation of carbon nanotubes, nanofibres and carbon nitride powders using plasma and CVD methods; hydrogen storage capability of nanofibres/nanotubes; electrically conducting composites
- Characterization of polymer solids and thin polymer films by dielectric relaxation spectroscopy and dynamic mechanical analysis
- Molecular modeling of polymer structures (LC; copolymers; interface/interphase in blends)
- Permeation of polymers; modeling of permeation; formation of barrier layers (fluorination and oxyfluorination by gas-phase or plasmachemical treatments)

Prof. Dr. Reimund Gerhard-Multhaupt

**Universität Potsdam, Institut für Physik
Chair of 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 the thickness direction of thin electret films, surface-potential and pyroelectrical probing in the film plane
- 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. 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 department VI "Function of Polymers" (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. Maultsch, 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 technics for the characterisation of polymers, e.g. with respect to molecular orientation, photo-oxidation, 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
(currently on special leave of absence)

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>

Dr. habil. Werner Jaeger

**Fraunhofer-Institut für Angewandte Polymerforschung Golm
Forschungsbereich „Wasserbasierende Polymersysteme“
Department “Water Born Polymers”**

Synthesis and characterization as well as selected application of completely or in part water soluble polyelectrolytes, hydrophilic gels and polymer colloids.

Water Soluble Polymers

- Synthesis: block, graft, comblike and alternating copolymers varying electro-chemical and molecular parameters; polymeric surfactants; reversible and irreversible gels.
- New technologies for the preparation of water soluble polymers: dispersion polymerization in aqueous systems, graft copolymerization in inverse emulsion, controlled radical polymerization.
- Selected application: processing aid for separation processes.

Polymer Colloids

- Synthesis: emulsion and dispersion polymerization in aqueous and inverse systems
- Products: Tailor-made dispersions concerning particle size and particle size distribution, particle morphology, functionality and reactivity
- Characterization: Size and density of particles, particle electrophoresis, charge titration rheology of concentrated dispersions.

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.

Mesoscopic organized colloidal systems

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. 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 - reaction 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 chemical 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 for such presentations are:

- organic and macromolecular chemistry,
- material sciences,
- environmental problems,
- everyday life chemistry.

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 Chemistry**

The Institute of Chemistry 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 Chemistry 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 Chemistry 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 Chemistry. 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 Chemistry 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.

**Federal Institute for Materials Research and Testing
Division VI.1 “Durability of Polymeric Materials”**

The division is part of the department VI “Performance of Polymeric Materials”
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 combustion behaviour 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/english/expertise/areas_of_expertise/department_6/division_61/division_61.htm

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-Institut für Kolloid- und Grenzflächenforschung

Department of 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:

- Stiff polymers like DNA couple to cationic as well as zwitterionic lipids building a nematic structure at the interface. The binding may be mediated by divalent cations which enables a weak and reversible coupling.
- Dyes within polyelectrolyte multilayers enable photoinduced charge transfer. This may be enhanced by building films with polarity gradients.
- 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.
- 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.

Prof. Dr. Dieter Neher

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

Research Subjects

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) at 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

**Technische Universität Berlin
Institut für Chemie**

Research Topics:

- Gas phase polymerization of propylene with heterogeneous catalysts.
Video microscopic studies of single catalyst particle growth during polymerization reaction and morphological studies of polymer particles.
- Gas phase and slurry polymerization of propylene in controlled mini reactor.
Studies of polymerization kinetics and polymer properties. Modelling and process design.
- Polyester synthesis. Development of methods for fast screening of catalysis in small scale.

R & D – Equipment (own development):

- Mini reactor for video microscopic studies of catalyst particle growth and polymer morphology during polymerization reaction.
- Micro balance reactor for kinetic studies of gas phase polymerization and monomer absorption of polymers.
- Controlled mini reactor for gas phase and slurry polymerization for on line kinetic studies of catalytic olefin polymerization at industrial conditions.

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 material 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.3: Analyse und Struktur von Polymeren**

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 undersratnding. 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

Interdisciplinary Research Centre Thin Organic and Biochemical Films

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
- Preparation of oxadiazole crystals and characterisation of their non-linear properties
- Synthesis and characterisation of liquid-crystalline oxadiazoles

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

- Synthesis of new polymers as sensitive materials or as resists for e-beam- and deep UV- lithography
- GPC and HPLC
- Polymer surface characterisation by AFM, ATR-IR-spectroscopy and contact angle measurements

Prof. Dr. J. Springer

(retired)

The research concerns with interdependencies of the chemical structure and the physical resp. physico-chemical properties of polymers. The synthesis of monomers and polymers is directed to the production of model substances resp. polymers with a defined structure as possible.

The topics within this research are:

Synthesis, analytic and properties of functional polymers:

Photoactive, redoxactive and liquid crystalline side group homo- and copolymers. Highly branched biocompatible carriers for x-ray contrast agents. *)

Rheo-optical properties of polymer solutions:

Light scattering of dilute solutions in shear flow (investigation of the shear-induced orientation and deformation of macromolecules) *)

Gas permeability of polymers:

Solubility of gases and their diffusion in polymers. *)

Interfacial properties of composite materials:

Fiber/polymer interfaces. Surface modifications. Adhesion. Wetting phenomena. Characterization of surfaces by electrokinetic measurements. Influence of surrounding gases on the interfacial tension of polymer liquid crystals. *)

*) The experimental investigations within these research fields are finished.

For further informations please visit the web site at:

<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>

Polydays 2004 und Gerhard-Kanig-Vorlesung

Die Fachtagung "Polydays" ist ein alle zwei Jahre stattfindendes internationales und interdisziplinäres Meeting, das sich an alle Studenten, Doktoranden und Wissenschaftler auf dem Gebiet der Polymerwissenschaften sowie Vertreter aus Industrie und Technik richtet und vom Berlin-Brandenburgischen Verband für Polymerforschung e.V. (BVP) gemeinsam im Wechsel mit der Technischen Universität Berlin, der Freien Universität Berlin, der Humboldt-Universität zu Berlin und der Universität Potsdam durchgeführt wird.

Die Polydays 2004 wurden vom Lehrstuhl Angewandte Physik kondensierter Materie der Universität Potsdam unter der Leitung von Prof. Dr. Reimund Gerhard-Mulhaupt durchgeführt, der gleichzeitig Geschäftsführer des BVP ist. Für die Hauptvorträge konnten von der Programmkommission, der Vertreter der Technischen Universität Berlin, der Freien Universität Berlin, der Humboldt-Universität zu Berlin, der Universität Potsdam, der Bundesanstalt für Materialforschung und -prüfung, des Fraunhofer-Institutes für Angewandte Polymerforschung Golm und des Max-Planck-Institutes für Kolloid- und Grenzflächenforschung Golm angehören, international renommierte Wissenschaftler gewonnen werden.

Aufsehen erregte der eingeladene Hauptvortrag von Professor Dr. Matthias Ballauff (Universität Bayreuth) zur Struktur von sogenannten Dendrimeren, baumartigen Riesenkülen, die durch ein synthetisches Wachstum über mehrere Generationen erzeugt werden. Im Gegensatz zur gängigen Vorstellung konnte Professor Ballauff in Modellrechnungen und Experimenten nachweisen, dass sich die einzelnen "Äste" der Dendrimere wieder ins Innere zurückfalten können. Dies führt dazu, dass die Dendrimere im Inneren dichter sind als am Rand und damit strukturell eher wie ein Busch aussehen als wie ein Baum.

Ein wesentlicher Höhepunkt der diesjährigen Tagung war die erstmals veranstaltete Gerhard-Kanig-Vorlesung. Die Vorlesung von Professor Dr. Gert Strobl (Universität Freiburg im Breisgau) zur Kristallisation von Polymeren korrigierte die noch weit verbreitete Vorstellung, dass Polymere in ähnlicher Weise kristallisieren wie anorganische Materialien. Stattdessen konnte Professor Strobl an Hand einer Fülle von experimentellen und theoretischen Ergebnissen zeigen, dass sich in Polymeren vor ihrem Zusammenwachsen zu messbaren Kristalliten lokal geordnete Bereiche aus jeweils mehreren Makromolekülsträngen bilden.

Schließlich sollen die fünf weiteren eingeladenen Hauptvorträge namhafter Polymerwissenschaftler aus England, Finnland, Frankreich und den Vereinigten Staaten von Amerika, die vierzig Kurzvorträge und die neunzig Posterbeiträge erwähnt werden, die der Tagung ihr wissenschaftliches Profil gaben. Als besonders nützlich erwies sich die Kurzvorstellung aller Posterbeiträge im Plenum. Mit mehr als 170 Teilnehmern, die den hervorragenden Konferenzstandort am Neuen Palais genießen konnten, und zahlreichen lebhaften Fachdiskussionen, verlief die Tagung sehr erfolgreich.

Ein besonderes Anliegen der Tagung ist die Förderung von Nachwuchswissenschaftlern. Vom BVP werden der Georg-Manecke-Preis und der Kurt-Ueberreiter-Preis ausgeschrieben, mit denen junge Berliner und Brandenburger Polymerwissenschaftlerinnen und Polymerwissenschaftler für herausragende wissenschaftliche Leistungen auf den Gebieten Chemie, Physik und Technik der Polymere ausgezeichnet

werden sollen. Der Georg-Manecke-Preis wird für die beste Arbeit vorzugsweise im Bereich der Chemie der Polymere und der Kurt-Ueberreiter-Preis für die beste Arbeit vorzugsweise im Bereich der Physik und der Technik der Polymere vergeben. Die Preise sind jeweils mit 1500 Euro dotiert. Die diesjährigen Preisträger des Kurt-Ueberreiter- und des Georg-Manecke-Preises, Frau Dr. Ildiko Gössl (ehemals HU Berlin) und Herr Dr. Arne Thomas (ehemals MPI-KGF Potsdam-Golm), berichteten über wesentliche Ergebnisse ihrer preisgekrönten Arbeiten.



Prof. Rabe und Prof. Strobl, Gerhard-Kanig-Vorlesung



Prof. Strobl, Gerhard-Kanig-Vorlesung

Conferences and workshops

Workshop of the German Society of Rheology (DRG)

Date: 22-23 April, 2004
Place: Federal Institute for Materials Research and Testing (BAM), Berlin
Organizer: Prof. Dr. W. Mielke
Topic: Rheologische Eigenschaften mehrphasiger Systeme

XIVth International Congress on Rheology (Rheology 2004)

Date: 22-27 August, 2004
Place: Seoul, Korea
Organizer: Korean Society of Rheology (Symposium-Organizer and Plenary Speaker Prof. Dr. M.H. Wagner, Technical University of Berlin)
Participants: 600

Polydays 2004

Date: 4-6 October, 2004
Place: University of Potsdam
Organizer: Prof. Dr. R. Gerhard-Multhaupt
Participants: 178 participants from academic and industrial institutions

Second Workshop “New Products for New Markets - New materials and their application in information technology and sensors”

Date: 1 December, 2004
Place: University of Potsdam
Organizer: Dr. B. Schulz
Participants: 50 participants from academic and industrial institutions

Scientific Activities of the Regular Members

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.

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Lectures

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

M. Abboud, K.-H. Reichert
Video Microscopic Studies of Growth and Morphology of Single Catalyst Particles in Propylene Polymerization
Borealis, Porvoo, Finland, September 2004

M. Abboud, K.-H. Reichert
Video Microscopic Studies of Growth and Morphology of Single Catalyst Particles in Propylene Polymerization
8th International Workshop on Polymer Reaction Engineering, Hamburg, October 2004

M. Abboud, K.-H. Reichert
Video Microscopic Studies of Growth and Morphology of Single Catalyst Particles in Propylene Polymerization
Prague Institute of Chemical Technology, Prague, Czech Republic, November 2004

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Video Microscopic Studies of Growth and Morphology of Single Catalyst Particles in Propylene Polymerization
Technische Universität Berlin, December 2004

M. Abboud, K.-H. Reichert
Video Microscopic Studies of Growth and Morphology of Single Catalyst Particles in Propylene Polymerization
University of Enschede, The Netherlands, October 2004

M. Antonietti
Chemie auf der Mesoskala: Neue Techniken und Chancen
GDCh-Vortrag an der Universität Würzburg, 15 January, 2004

M. Antonietti
Chemische Nanotechnologie oder die Rückkehr der A1-Chemisten
Vortrag im Rotary Club Potsdam, May 2004

M. Antonietti
Colloidal structure and templating of novel materials
Vortrag bei EURESCO/ESF in Giens/Toulon, France, September 2004

M. Antonietti
Encoded polymer self-organization for mesostructured materials
Vortrag beim Max-Planck-Society/UCSB Workshop, "Future Trends in Materials", at UCSB, USA, February 2004

M. Antonietti

Kontrolle von Nanokristallisationsprozessen

Vortrag bei der Firma Clariant in Sulzbach, April 2004

M. Antonietti

Mesoporous Materials by Nanocasting: Synthesis, Characterization, and their use for Nanochemistry

Vortrag bei "Nanochemistry 2004" in Marburg, May 2004

M. Antonietti

Nanocasting of colloidal structures: Porous Materials meet colloid analysis

Plenary Lecture by ECIS, Almería, Spain, September 2004

M. Antonietti

New surfactant structures: The key to chemical nanotechnology and new processes

Plenary Lecture, 6th World Surfactants Congress Berlin, June 2004

M. Antonietti

Synthesis of porous polymers by template techniques, phase separation, foaming, and some of the more exciting applications

Vortrag beim Workshop "NANO-MESO POROSITES DANS LES POLYMERS: synthese, procédés d'élaboration, applications", Lyon, France, 23 January, 2004

M. Antonietti

The self-assembly of nanoparticles towards diverse organized arrays

Vortrag bei "Particles 2004", Orlando, USA, March 2004

J.-F. Baussard, S. Bruzzano, A. Laschewsky, M. Mertoglu, J. Storsberg

Kontrollierte freie radikalische Polymerisation mittels RAFT als Zugang zu gut definierten Polyelektrolyten

Fortschritte in der Polymersynthese - GDCh-Tagung 2004, Fachgruppe "Makromolekulare Chemie", Düsseldorf, 15-16 March, 2004

G. Boese, M. Zierke, C. Trimpert, W. Albrecht, M. Becker, M. Schossig, T. Groth, A. Lendlein

Design of polymer scaffolds to support dermal and epidermal reconstruction

Strategies in Tissue Engineering, Internationale Konferenz, Würzburg, 16-19 June, 2004

L. Brehmer, P. Karageorgiev

Optically induced nanoscale effects and nanomanipulation in organic thin films

4th International Conference on Advanced Optical Materials and Devices AOMD-4, Tartu, Estonia, 6-9 July, 2004

U. Buller

Chancen erkennen - Risiken abschätzen - Die unendliche Geschichte von Forschung und Entwicklung

Symposium "Strategien für eine nachhaltige Zukunftsgestaltung", Plastics Europe und BKV, Bonn, 30 November, 2004

U. Buller

Polytronik - Polymere als Basis einer neuen Elektronik?

VDMA-Kongress "Zukunftstechnologie Polymerelektronik", München-Erding,
28 October, 2004

Ch. Ecker, J.P. Rabe

Nonequilibrium conformations of single adsorbed polymer chains

Polydays 2004, Potsdam, 4-6 October, 2004

M. Ellero, S. Hess

Smoothed Particle Dynamics simulations of non-Newtonian fluids

CCP5 Workshop on Mesoscale Modelling of Liquids, Guildford, United Kingdom,
19 April, 2004

G.H. Findenegg

Adsorption und Aggregation von Tensiden und amphiphilen Blockcopolymeren an
Festkörperoberflächen

GDCh-Vortrag, Merseburg, 25 October, 2004

G.H. Findenegg

Adsorption und Aggregation von Tensiden an hydrophilen und hydrophoben
Festkörperoberflächen

18. Vortragstagung der GDCh-Fachgruppe "Waschmittelchemie", Königswinter,
29-30 April, 2004

G.H. Findenegg

Mesoskopische Systeme: Einfluss der räumlichen Begrenzung auf Struktur und
Phasenübergänge

GDCh-Vortrag, Münster, 25 October, 2004

G.H. Findenegg

Microstructured block copolymer layers on silicon wafers

12. Wolfgang-Ostwald-Kolloquium der Kolloid-Gesellschaft "Inorganic Colloid
Science - Importance of Layered Materials", Kiel, 25-26 March, 2004

G.H. Findenegg

Periodisch mesoporöse Silikate: "Reagenzgläser" zum Studium des Stoffverhaltens
in eingeschränkter Geometrie

Chemisch-Physikalische Gesellschaft, Vienna, 23 March, 2004

G.H. Findenegg

Studium der räumlichen Begrenzung auf das Zustandsverhalten von Stoffen in
nanoporösen Silika-Materialien

GDCh-Vortrag, Oldenburg, 22 January, 2004

G.H. Findenegg

Water Depletion at Hydrophobic Solid Surfaces

Gordon Research Conference "Water and Aqueous Solutions", Plymouth, New
Hampshire, USA, 1-6 August, 2004

H.-P. Fink

Cellulose fibre and materials research

Lecture, Buckeye Technologies Int., Memphis, TN, USA, 18 May, 2004

H.-P. Fink

Cellulose-new prospects by modern processing routes

11th Int. Conf. Polymeric Mat. P2004, Halle, 29 September - 1 October, 2004

H.-P. Fink

New cellulose based materials

Lecture, Eastman Chemicals, Kingsport, TN, USA, 20 May, 2004

H.-P. Fink

New cellulose fibres as a precursor for carbon-fibres?

Lecture, Highland Industries, Greensboro, NC, USA, 21 May, 2004

H.-P. Fink

New Developments of Cellulose Fibres

Lecture, USDA, Southern Regional Research Centre, New Orleans, USA,
17 May, 2004

H.-P. Fink

Technische Cellulose-Spinnfasern - Herstellung, Eigenschaften, Verfügbarkeit

Workshop "Neue Konstruktionswerkstoffe als Verbundmaterialien aus Commodity

Thermoplasten und Cellulose-Spinnfasern", Fraunhofer ICT, Pfinztal, 24 November,
2004

H.-P. Fink, A. Bohn, M. Pinnow, J. Kunze

Determination of the fiber fraction of cellulose-polypropylene composites

5th Global Wood and Natural Fibre Composites Symposium, Kassel, 27-28 April,
2004

H.-P. Fink, J. Ganster

Neue Commodity - Verbundmaterialien unter Verwendung von Cellulose-Spinnfasern

5. Schwarzheider-Kunststoffkolloquium, Schwarzheide, 16 November, 2004

B. Frick, C. Alba-Simionesco, G. Dosseh, C. Le Quellec, A. Morena, J. Colmenero,
A. Schönhals, R. Zorn, K. Chrissopoulou, S. Anastasiadis, K. Dalnoki-Veress
Inelastic neutron scattering for investigating the dynamics of confined glass forming
liquids

International Conference on Broadband Dielectric Spectroscopy, Delft, The
Netherlands, 23-26 August, 2004

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C.D. Simpson, M.D. Watson, K. Müllen, F. Von Kieseritzky, J. Hellberg, S.K.M.
Jönsson, M. Fahlmann, F. Jäckel, P. Samorí, J.P. Rabe

Surface-induced vertical alignment of self-assembled supramolecular columns of
large polycyclic aromatic hydrocarbons and porphyrins

E-MRS Spring Meeting 2004, Strasburg, France, 24-28 May, 2004

J. Friedrich

Introduction of functional groups onto polymer surfaces
Institutionskolloquium bei GKSS-Teltow, 22 October, 2004

J.F. Friedrich, R. Mix, G. Kühn
Adhesion of metals to plasma-induced functional groups at polymer surfaces
PSE 2004, Garmisch-Partenkirchen, 13-17 September, 2004

J. Friedrich, R. Mix, G. Kühn
Contribution of chemical interactions to the adhesion between aluminium and functional groups of different (mono-) type and density at polymer surfaces
EURADH 2004, Freiburg (Br.), 5-9 September, 2004

L. Frunza, H. Kosslick, I. Pitsch, S. Frunza, A. Schönhals, C. Krause, F. Stallmach, J. Kärger
14. International Zeolite Conference IZC2004, Cape Town, South Africa, 25-29 April, 2004

T. Fütterer, T. Hellweg, Findenegg
Aggregationsverhalten von amphiphil substituierten Polyparaphenylenen
18. Vortragstagung der GDCh-Fachgruppe "Waschmittelchemie", Königswinter, 29-30 April, 2004

R. Gerhard-Multhaupt
Composite Electrets: Materials Combinations with Enhanced Properties
School on Polymers and Composites for Microelectronics and Robotics, Wierzba, Poland, 10-13 May, 2004

R. Gerhard-Multhaupt
Ferroelectrete: Elektrisch geladene Polymerschäume mit ferroelektrischen Eigenschaften für Sensor- und Aktor-Anwendungen
Werkstoffwissenschaftliches Kolloquium, Universität Erlangen, 10 February, 2004

R. Gerhard-Multhaupt
From Electrets to Ferroelectrets - An Introduction
VTT + FhG Smart Materials Workshop, Pirkkala, Finland, 25 November, 2004

R. Gerhard-Multhaupt
Multi-Functional Dielectric Materials: Where do we come from? Where do we want to go?
IEEE 8th International Conference on Solid Dielectrics, Toulouse, France, 5-9 July, 2004

R. Gerhard-Multhaupt
Polymeric Space-Charge Electrets
School on Polymers and Composites for Microelectronics and Robotics, Wierzba, Poland, 10-13 May, 2004

R. Gerhard-Multhaupt

Weniger kann mehr sein: Elektrisch geladene Polymerschäume für vielfältige Anwendungen in Sensorik und Aktorik
Wirtschaft trifft Wissenschaft, Fraunhofer-Institut für Angewandte Polymerforschung, Potsdam-Golm, 1 December, 2004

R. Gerhard-Multhaupt, A. Mellinger, M. Wegener
Ferroelectrets: Polymer Foams with "Man-Made" Highly Deformable Dipoles
3rd Broadband Dielectric Spectroscopy and 8th Dielectric and Related Phenomena Conference, Delft, The Netherlands, 23-26 August, 2004

T. Hellweg, H. Egger, G.H. Findenegg
Structure and Elastic Properties of a Block-Copolymer Bilayer Doped with Cationic Surfactants
18th Conference of the European Colloid and Interface Society (ECIS), Almería, Spain, September 2004

S. Hess
Regular and chaotic orientational and rheological behavior of liquid crystals
Int. Conference on Colloids in External Fields CODEF, Bonn, 29 March, 2004

S. Hess
Structure of streaming fluids
Department of Chemical Engineering, Univ. Federico II, Neapel, Italy, 29 October, 2004

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Structure of streaming fluids
Institut für Polymere, ETH Zürich, Switzerland, 8 December, 2004

S. Hess
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Intelligente Polymere

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D. Neher
Auf dem Weg zur Polymerelektronik
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D. Neher
Halbleitende Polymere, eine Herausforderung für die Strukturanalyse
Festkolloquium für Dr. G. Lieser am MPI für Polymerforschung, Mainz, 5 November, 2004

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Highly-efficient Polymer Electrophosphorescent Devices
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Nanoelektronik mit Polymeren
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Nanopartikel halbleitender Polymere - Spektroskopie und Devices
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25 March, 2004

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Nanoparticles of Semiconducting Polymers - Spectroscopy and Devices
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Optomechanik und Optoelektronik mit Polymeren
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Semiconducting Polymer Nanoparticles
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D. Neher
Struktur und Ladungstransport in halbleitenden Polymerschichten
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M. Patzlaff, K.-H. Reichert
Sorption Measurements of Propylene in Polypropylene produced by Ziegler-Catalyst
Borealis, Porvoo, Finland, September 2004

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J.P. Rabe
A Prototypical Single-Molecule Chemical-Field-Effect Transistor with Nanometer-
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J.P. Rabe

Assembly, Manipulation and Properties of Molecular Nanocomposites on Solid Substrates

12th International Symposium on Advanced Materials, Tsukuba, Japan, 7-10 December, 2004

J.P. Rabe

Assembly, Manipulation and Properties of Molecular Nanocomposites on Solid Substrates

Workshop SFB 625, Mainz, 13-15 October, 2004

J.P. Rabe (invited)

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

Giornate di Studio: Metodi di Caratterizzazione dei Materiali, Politecnico di Milano, Milano, Italy, 18 February, 2004

J.P. Rabe (invited)

Electronic functions of single supramolecular nanostructures at interfaces

E-MRS Spring Meeting 2004, Strasburg, France, 24-28 May, 2004

J.P. Rabe

Experimente mit einzelnen Makromolekülen auf Festkörperoberflächen

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J.P. Rabe

Experiments with Single Macromolecules

Symposium Polymer Research - Problems, Pathways, Progress, Max-Planck-Institut für Polymerforschung, Mainz, 10-11 June, 2004

J.P. Rabe

Manipulation of single macromolecules at solid-fluid interfaces

14. Wolfgang-Ostwald-Kolloquium, Berlin, 22-23 November, 2004

J.P. Rabe (invited)

Molecular Monolayers as a Tool for the Development of a Biomolecular Nanotechnology

Kolloquium DOBS, Universität Potsdam, 25 February, 2004

J.P. Rabe (invited)

Scanning Tunneling-Microscopy and -Spectroscopy of Nanostructured Molecular Layers

Opening "Center of Nanostructured Materials and Analytics, TU Chemnitz, 19 April, 2004

J.P. Rabe

Von großen Molekülen und kleinen Funktionselementen - Experimente mit einzelnen Makromolekülen auf Festkörperoberflächen

Physikalisches Kolloquium Universität Freiburg, 13 December, 2004

On the prediction of adhesive properties by wettability and contact angle measurements

12th Annual POLYCHAR World Forum on Advanced Materials, University of Minho, Guimaraes, Portugal, 6-9 January, 2004

D. Richter, J. Springer

Structure/property relationship of carbon fibre reinforced nylons: Comparison of five surface energy models based on an correlation analysis of wetting data and practically obtained adhesion data

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M. Saphiannikova, O. Henneberg, T.M. Geue, U. Pietsch, P. Rochon

Non-linear effects during inscription of azobenzene surface relief gratings

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R. Schomäcker

Microemulsions as versatile Reaction Media

Vortrag auf Rütgers Research Conference, Düsseldorf, 15 November, 2004

R. Schomäcker, C. Han, A. Schmidt

Ein Vergleich von Struktur und Eigenschaften von katalytisch aktiven Membranen aus Keramik und Polymeren

Vortrag auf XXXVII. Jahrestreffen Deutscher Katalytiker, Weimar, 17 March, 2004

R. Schomäcker, A. Schmidt, R. Haidar, L. Gröschl

Selectivity of Partial Hydrogenation Reactions in a Membrane Reactor

Vortrag auf 6th International Conference on Catalysis in Membrane Reactors, Lahnstein, 6 July, 2004

A. Schönhals

The behavior of polymers confined to nanoporous glasses: Investigated by dielectric, thermal and neutron spectroscopy

Toulouse, France, 21 July, 2004

A. Schönhals

The behaviour of polymers in nanoconfinements

Ostwald Colloquium, Berlin, 22-23 November, 2004

A. Schönhals

Polymers in Nano-Confinements: What can we learn from relaxation and scattering experiments?

International Conference on Broadband Dielectric Spectroscopy, Delft, The Netherlands, 23-26 August, 2004

S. Schrader, L. Brehmer

Organische Elektronik und Nanotechnologie: Innovationspotential Supramolekularer Organischer Systeme und Dünner Organischer Schichten

Projektlabor "Organische Nanostrukturen", Universität Potsdam, 9-13 February, 2004

B. Schulz

Ultrathin Films based on polyimides for nanofabrication and devices
ECOF 2004, Valladolid, Spain, 21-25 July, 2004

B. Schulz, Th. Köpnick
New photoactive materials for nanotechnology and microsensors
12. GMA/ITG-Tagung "Sensoren und Messsysteme 2004", Ludwigsburg,
15-16 March, 2004

B. Schulz, T. Köpnick, M. Schirmer, M. Bruma
Polyheterocyclics as ultrathin Films for nanofabrication and devices
XIII. International Materials Research Conference, Cancun, Mexico, 22-26 August,
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Biodegradable shape-memory polymers as implant materials
Strategies in Tissue Engineering, Internationale Konferenz, Würzburg, 16-19 June,
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Interplay between intermediate structure and flow in crystalline systems
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Transport through model porous structures studied via molecular dynamics
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R. Steitz, S. Schemmel, P. Müller-Buschbaum, R. Cubitt, G.H. Findenegg
Water Depletion and Nanobubbles at a Solid-Liquid Interface
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H. Steuer, S. Hess

Calculation of twist elastic coefficient via director fluctuations
32. Arbeitstagung Flüssigkristalle, Halle, 26 March, 2004

V. Strehmel, H. Kraudelt, H. Wetzel, E. Görnitz, A. Laschewsky
Free Radical Polymerization of Methacrylates in Ionic Liquids
227th ACS National Meeting, Anaheim, California, USA, 28 March - 1 April, 2004

D.J. Tartakowska, M. Schnabelrauch
Degradation of biodegradable PLA/PVL copolymers for medical application under dynamic condition
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Z. Tartakowski, D.J. Tartakowska
Influence of altering factors on high filled with organic filler polypropylene
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Z. Tartakowski, D.J. Tartakowska
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Influence of UV-VIS light on physical properties of thin films of azobenzene derivatives
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M.H. Wagner
Challenges in nonlinear rheology of linear and long-chain branched polymer melts
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Elongational rheology as a structural probe for polymer melts
TOSOP Corp., Yokkaichi, Japan, 2 September, 2004

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Extensional rheology for structural characterisation
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M.H. Wagner
Melt rheology of industrial polymers: relating stress to strain and energy
INNFM Conference "Industrial Rheology", University of Wales, Chester, United Kingdom, 5-8 April, 2004

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Methodology of microscale mechanical testing of PE and PP
BP Amoco, Brüssel, Belgien, 26 April, 2004

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Modelling melt elongational behavior of LLDPE/LDPE blends
MACRO 2004, Paris, France, 4-9 July, 2004

M.H. Wagner
Molecular Stress Function, basic concepts
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Nonlinear rheology of entangled linear and branched polymer liquids
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Polymer stents as drug delivery systems
Supernet 2004, Bled, Slowenien, 10-17 May, 2004

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The nonlinear rheology of linear and long-chain branched polymer melts
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H.-M. Wache, A. Hentrich, H. Käufer, M.H. Wagner
Development of a polymer stent with shape memory effect as a drug delivery system
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W. Wu, Q. Qian, W. Pu, M.H. Wagner
Study on the Morphology and Barrier Mechanism of PET/PEN Blends
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A. Zen, M. Saphiannikova, D. Neher
Organic Field Effect Transistors based on Poly(3-hexylthiophene)s
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F. Zygalsky, I. v. Lampe, M.H. Wagner
Herstellung und Charakterisierung von oxidischen hochtemperatursupraleitenden
dünnen Filmen aus Polymer-Metall-Precursoren
Polydays 2004, Potsdam, 4-6 October, 2004

Master Theses / Diplomarbeiten

Dilek **Akcakayiran** (G.H. Findenegg)

Funktionalisierung der Porenwände von SBA-15 Silika und Einlagerungen von Metall-Koordinations-Polyelektrolyten in die Poren

Technische Universität Berlin

Bahjat **Amro** (M.H. Wagner)

Einfluß der Verarbeitungsparameter auf die mechanischen Eigenschaften von Thermoplastkleinprüfstäben

Technische Universität Berlin

Stefanie **Andres** (J. Koetz)

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

Universität Potsdam

Afana **Ashraf** (M.H. Wagner)

Entwicklung eines Verfahrens zur Herstellung von Bauteilen aus Abfällen aus der Pulverlackherstellung und -verarbeitung

Technische Universität Berlin

Fatma **Arslan** (R. Schomäcker)

Enantioselective Ester Hydrolysis Catalyzed by Molecularly Imprinted Polymers based on Immobilized Templates

Technische Universität Berlin

Manja **Azizi** (R. Schomäcker)

Untersuchungen zur Rückgewinnung von aktiven RU-Katalysatoren durch Ultrafiltration

Technische Universität Berlin

Jianhua **Ba** (M. Antonietti)

The synthesis of macroporous polymer gels and their use as scaffolds for fuel cell membranes and catalysts

Universität Potsdam und MPI KG

Kona **Balakantharao** (M. Hennecke, S. Weidner)

Functionalization of polydienes and their characterization using MALDI mass spectroscopy

Technische Universität Berlin und Bundesanstalt für Materialforschung und -prüfung

Mahmoud **Charri** (M.H. Wagner)

Anwendungsorientierte Prüfung von Bauteilen aus Abfällen aus der Pulverlackherstellung und -verarbeitung

Technische Universität Berlin

Mohammed **Eita** (G.H. Findenegg)

Mesostructured Silica Thin Films: Preparation and Characterization

Technische Universität Berlin

Samir Essemlali **el Atter** (M.H. Wagner)
Vergleich verschiedener Trocknersysteme für Kunststoffe
Technische Universität Berlin

Anastasia **Erdmann** (A. Laschewsky)
Präparation und Charakterisierung ultradünner Polyelektrolytfilme
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Benjamin **Frank** (R. Schomäcker)
Untersuchung neuer Katalysatoren für die Dampfreformierung von Methanol im
Festbett- und Membranreaktor
Technische Universität Berlin

Dennis **Herklotz** (M.H. Wagner)
Untersuchung und Beurteilung polymerbeschichteter Stents
Technische Universität Berlin

Nicole **Jagielski** (J. Koetz)
Nanopartikelbildung in polymermodifizierten phosphatidylcholinen Mikroemulsionen
Universität Potsdam

David **Koandi** (M.H. Wagner)
Entwicklung und Konstruktion eines Drehgriffes aus Polypropylen für einen Bürostuhl
Technische Universität Berlin

Claudia Daniela **Kunick** (R. Schomäcker)
Untersuchungen zum Transport von Gasen durch mesoporöse Materialien
Technische Universität Berlin

Patrick **Kurr** (R. Schomäcker)
Vergleich der Reaktorleistung eines Membranreaktors mit einem Festbett bzw.
Rieselreaktor am Beispiel der katalytischen Hydrierung von α -Methylstyrol
Technische Universität Berlin

Simon **Lindenmann** (R. Schomäcker)
Biological Separations Using Magnetic Fluids
Technische Universität Berlin

Liset **Lüderitz** (M.H. Wagner)
Influence of the structure of hyperbranched polymers on the release kinetics of
pharmaceuticals
Technische Universität Berlin

Kristin **Pawlowski** (R. Schomäcker)
Möglichkeiten und Grenzen der Analyse von Polymerwerkstoffen mit Hilfe der
Pyrolyse-GC/MS (*extern Porsche*)
Technische Universität Berlin

Victor-Hugo **Rolon-Garrido** (M.H. Wagner)
Strong Flows of Polymer Melts in Shear Rheometry
Technische Universität Berlin

Daniel **Schulenburg** (R. Schomäcker)
Stabilität und Aktivität der Lipase für eine kinetische Racematspaltung in einem
wässrig-organischen Zweiphasensystem
Technische Universität Berlin

Guntram **Schwarz** (J. Koetz)
Selbstorganisationsphänomene in konzentrierten Polyanionen-Polykationen-
Systemen
Universität Potsdam

Özlem **Sel** (M. Antonietti)
Towards Functional Hierarchical Polymer Colloids
Universität Potsdam und MPI KG

Thomas **Ulbricht** (R. Schomäcker)
Polyacrylsäure als Membranmaterial für Brennstoffzellen
Technische Universität Berlin

Sheng **Wang** (M.H. Wagner)
DSC- und TMDSC-Messungen an ausgewählten Polymerproben
Technische Universität Berlin

Ph.D. Theses / Dissertationen

Gerald **Bode** (R. Schomäcker)

Wertorientierte und ökologische Beurteilung chemischer Produkte und Prozesse unter "Risiko"

Technische Universität Berlin

Ulrike **Braun** (M. Hennecke)

Wirkungsmechanismen von Rotem Phosphor als Flammschutzmittel in Thermoplasten

Freie Universität Berlin und Bundesanstalt für Materialforschung und -prüfung

Atul Suresh **Deshpande** (M. Antonietti)

Synthesis of Porous Oxide for catalytic applications using templating techniques

Universität Potsdam und MPI KG

Wen-Fei **Dong** (H. Möhwald)

Polyelectrolyte Multilayer Capsules: Structure, Encapsulation, and Optical Properties

Universität Potsdam und MPI KG

Holger **Egger** (G.H. Findenegg)

Struktur und elastische Eigenschaften lyotroper Mesophasen von Blockcopolymeren unter dem Einfluss kationischer Tenside

Technische Universität Berlin

Marco **Ellero** (S. Hess)

Smoothed Particle Dynamics Methods for the Simulation of Viscoelastic Fluids

Technische Universität Berlin

Andreas **Erbe** (M. Antonietti)

Ellipsometrische Lichtstreuung als neue Methode zur Charakterisierung der Grenzfläche von Kolloiden

Universität Potsdam und MPI KG

Tobias **Fütterer** (G.H. Findenegg)

Aggregationseigenschaften von amphiphil substituierten Polyparaphenylenen im Reinzustand, in Lösungen und in Monoschichten

Technische Universität Berlin

Lothar **Gröschel** (R. Schomäcker)

Charakterisierung von Polyacrylsäure-Palladiumverbundsystemen und ihre Anwendung im Membranreaktor

Technische Universität Potsdam

Rami **Haidar** (R. Schomäcker)

Hydrierreaktionen in katalytisch aktiven Porenmembranen in einem Schlaufenreaktor

Technische Universität Berlin

Marc **Herzhoff** (R. Schomäcker)

Szenario-Technik in der chemischen Industrie

Technische Universität Berlin

Tiezheng **Ji** (G. Hinrichsen)
Herstellung und elektrische Eigenschaften von Ruß/UHMWPE-Verbunden
Technische Universität Berlin

Carl Christoph **Jung** (J. Stumpe, L. Brehmer)
Lichtinduzierte Generierung und Charakterisierung optischer Anisotropie
Universität Potsdam

Tobias **Kimmel** (R. Schomäcker)
Kinetic Investigation of the Base-catalyzed Glycerolysis of Fatty Acid Methyl Esters
Technische Universität Berlin

Lazar **Kulikovsky** (D. Neher)
Experimentelle Untersuchung der Ladungsträgerdynamik in photorefraktiven Polymeren
Universität Potsdam

Lidong **Li** (H. Möhwald)
Polyelectrolyte Hollow Capsules Functionalized for Vectorial Electron Transfer
Universität Potsdam und MPI KG

Magdalena **Losik** (M. Antonietti)
Phasenverhalten von Polypeptid-Blockpolymeren
Universität Potsdam und MPI KG

Gordon **Lucas** (M. Antonietti)
Gradientenzentrifugation: Neue Anwendungen eines klassischen Verfahrens
Universität Potsdam und MPI KG

Anette **Nordskog** (G.H. Findenegg)
Strukturveränderung von Blockcopolymermizellen durch Zusatz von Tensiden
Technische Universität Berlin

Jan **Prockat** (M.H. Wagner)
Developing Large Structural Parts for Railway Application
Technische Universität Berlin

Liliana Patricia **Ramirez Rios** (M. Antonietti)
Superpara- and para magnetic polymer colloids by miniemulsion processes
Universität Potsdam und MPI KG

David Immanuel **Richter** (J. Springer)
Oberflächencharakterisierung von aliphatischen Polyamiden zur Bewertung adhäsiver Wechselwirkungen in carbonfaserverstärkten Verbunden
Technische Universität Berlin

Mihaela **Rusu** (H. Möhwald)
Phase transitions of thermoreversible polymers in polyelectrolyte multilayers
Universität Potsdam und MPI KG

F. **Santoso** (A. Lendlein)

Untersuchungen zur Simultanaminierung und Porenöffnung von Polyetherimid-Membranen

Universität Potsdam

Sebastian **Schemmel** (G.H. Findenegg)

Struktur und Dynamik flüssiger Mischungen in mesoporösen Gläsern:
Untersuchungen mit Neutronenstreuverfahren

Technische Universität Berlin

Cornelia **Sinn** (M. Antonietti)

Ionenverbindung an Polymeren und Lipidmembranen in wässrigen Lösungen

Universität Potsdam und MPI KG

Neli S. **Sobal** (H. Möhwald)

Kolloide Nanosysteme aus magnetischen und metallischen Materialien: Synthese und Charakterisierung

Universität Potsdam und MPI KG

Igor **Stankovic** (S. Hess)

Study of interplay between structure and flow in embedded-atom systems

Technische Universität Berlin

Haiko **Steuer** (S. Hess)

Thermodynamical Properties Of A Model Liquid Crystal

Technische Universität Berlin

Andreas **Taden** (M. Antonietti)

Kristallisationsphänomene in Miniemulsionssystemen: Geordnete Strukturen und Anwendungen für die Enzymatische Polymerisation

Universität Potsdam und MPI KG

Diana **Tartakowska** (M.H. Wagner, G. Rafler)

Degradationskinetik von medizinisch relevanten bioabbaubaren Copolymeren unter statischen und dynamischen Bedingungen

Technische Universität Berlin

Hans-Martin **Wache** (M.H. Wagner, P. Ewert)

Optimierung des Memory-Verhaltens von Kunststoffen am Beispiel eines polymeren Stents

Technische Universität Berlin

Sebastian **Wohlrab** (M. Antonietti)

Polymerinduzierte Morphogenese bei der Kristallisation von Aminosäuren

Universität Potsdam und MPI KG

Chenggang **Xü** (B. Schulz, L. Brehmer)

Preparation and characterization of vapour deposited films based on substituted 2,5-diphenyl-1,3,4-oxadiazole derivatives

Universität Potsdam

Hesna Hülya **Yildiz Ünveren** (R. Schomäcker)
Hydroformylation of long chain olefins in microemulsion
Technische Universität Berlin

Erkang **Yu** (G.Hinrichsen, M.H. Wagner)
Herstellung und Charakterisierung von Blends aus technischen und
hochtemperaturbeständigen Polymeren
Technische Universität Berlin

Xiuli **Yue** (H. Möhwald)
Monolayer Phase Behavior of Bipolar Amphiphiles and their coupling with DNA
Universität Potsdam und MPI KG

Frank **Zygalsky** (G. Hinrichsen, M.H. Wagner)
Herstellung und Charakterisierung von oxidischen hochtemperatursupraleitenden
dünnen Filmen aus Polymer-Metall-Precursoren
Technische Universität Berlin

Habilitation Theses / Habilitationen

Dr. Helmut **Schlaad** (M. Antonietti)

Polymer Self-Assembly: Adding Complexity to Mesostuctures of Diblock Copolymers
by Specific Interactions

Universität Potsdam und MPI KG

Dr. Sigurd **Schrader** (L. Brehmer)

Elektronische Struktur und Anregungsprozesse organischer Halbleiter

Universität Potsdam

Patents

H.-P. Fink, P. Weigel

Verfahren zur Herstellung von Fasern und anderen Formkörpern aus Cellulosecarbamat und/oder regenerierter Cellulose

AZ 10 2004 007 616.2, Anmeldetag 17.02.2004

J. Ganster, H. Ebeling, H.-P. Fink

Thermoplastischer Verbundwerkstoff und Verfahren zu dessen Herstellung

AZ 10 2004 061 767.8, Anmeldetag 22.12.2004

J. Ganster, H.-P. Fink

Rieselfähiger Pellets aus cellulosischen Spinnfasern, Verfahren zu deren Herstellung und deren Verwendung

AZ 10 2004 045 711.5, Anmeldetag 21.09.2004

M. Pinnow, H.-P. Fink

Verfahren zur Bestimmung von Kennwerten und/oder der Homogenität einer offenporigen Materialschicht

AZ 10 2004 050 961.1, Anmeldetag 19.11.2004

P. Weigel, H.-P. Fink, M. Doss

Verfahren zur Herstellung von Vliesstoffen, Vliesstoff und dessen Verwendung

AZ 10 2004 007 618.9, Anmeldetag 17.02.2004

P. Weigel, H.-P. Fink, M. Doss

Verfahren zur Herstellung von Vliesstoffen, Vliesstoff und deren Verwendung

AZ 10 2004 007 617.0, Anmeldetag 17.02.2004

Awards

A. Lendlein

Nominierung für den Deutschen Gründerpreis 2004, Kategorie Visionär, Berlin

A. Lendlein

Technology Pioneer 2004, Welt-Wirtschafts-Forum, Genf, Schweiz

B. Schulz

Award for Innovation Berlin/Brandenburg for “Thermostable protecting layers in flip-chip technology”

B. Schulz, B. Grimm, K. Günther

Technology Transfer Award 2004 of the Technology Foundation Brandenburg for: “Thermostable polymers for applications in microelectronic device production”

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 2004

Physikalische Chemie der Polymeren II 1 V	Hennecke
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Wintersemester 2004/2005

Short course in physical chemistry of polymers MSPS 1 V	Hennecke
Physikalische Chemie der Polymeren I 1 V	Hennecke

Sommersemester 2004

Kolloquium zur Makromolekül- und Vielteilchenphysik 2 SE	Rabe Röder Sokolov Schimansky-Geyer
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Wintersemester 2004/2005

Biophysik im Überblick 2 SE	Hermann Rabe
Introduction to Polymer Physics MSPS 4 V, 2 SE	Sokolov
Kolloquium zur Makromolekül- und Vielteilchenphysik 2 SE	Rabe Röder Sokolov Schimansky-Geyer
Physik von Makromolekülen 2 V, 2 UE	Rabe
Polymer Characterization MSPS 4 V, 2 SE, 8 PR	Rabe Kirstein Severin Koch Barner Ecker Jäckel Zhuang

Sommersemester 2004

Kolloquium des sfb 448 „Mesoskopisch strukturierte Verbundsysteme“ 2 SE	Hess
Konstruieren mit Kunststoffen II 2 V, 2 UE	Wagner Wache
Kunststoffrecycling 2 V	Wagner Tartakowska
Kunststoffverarbeitung II 2 V, 4 PR	Wagner Rautenberg
Messtechnische Übungen 2 PR	Wagner Rautenberg
Rheologie der Polymerschmelzen I 2 V, 2 PR	Wagner
Physikalische Eigenschaften der Kunststoffe 2 V, 1,5 UE + PR	H. Springer Wagner
Polymerwissenschaftliches Seminar 2 SE	Wagner Rautenberg H. Springer
Simulationsverfahren in der Statistischen Physik 2 V	Hess
Surface Science of Polymers 2 V, 2 UE	Findenegg v. Klitzing
Theorie der Transportvorgänge 2 SE	Hess

Wintersemester 2004/2005

Current Topics of Colloid and Interface Science 2 V, 1 SE	Findenegg Hellweg Steitz
Herstellung, Verarbeitung und Anwendung der Kunststoffe 2 V, 1 UE + PR	Wagner H. Springer
Kolloquium des sfb 448 „Mesoskopisch strukturierte Verbundsysteme“ 2 SE	Hess
Kunststoffverarbeitung I 2 V, 4 PR	Wagner Rautenberg
Messtechnische Übungen 2 PR	Wagner Rautenberg
Polymerwissenschaftliches Seminar 2 SE	Wagner Rautenberg H. Springer
Rheologie der Polymerschmelzen II 2 V, 2 UE	Wagner
Theorie der Transportvorgänge 2 UE	Hess

Sommersemester 2004

Biophysics of Membranes and Cells 2 V	Möhwald Sukhorukov
Biopolymer and Colloidal Laboratory MSPS 4 PR	Koetz Kosmella 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
Moderne Methoden der Charakterisierung von Grenzflächen und Kolloiden 2 SE	Möhwald Miller
Modern Methods of Polymer Synthesis MSPS 2 V	Laschewsky Tauer Strehmel
Organic Semiconductors 2 V	Neher
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 Abetz
Polymers as high-tech materials 2 V	Schulz
Seminar „Materialien in den Lebenswissenschaften“ 2 SE	Lendlein
Spezialpraktikum zur Kolloid- und Polymerchemie PR (4 Wochen)	Koetz Laschewsky Kosmella Strehmel
Strukturbildung in kolloidalen Systemen 2 V	Koetz Antonietti

Wintersemester 2004/2005

Einführung in die Biomaterialien 2 V	Lendlein
Implants and Prosthetics V	Lendlein
Introduction in Nanotechnology 2 V	Schulz
Introduction to Biomaterials Science 2 V	Lendlein
Introduction to Soft Matter Physics 2 V, 1 UE	Gerhard-Multhaupt Neher
Kolloidchemie I 2 V, 1 SE	Koetz Kosmella
Modern Aspects of Colloid Science 2 V	Koetz Antonietti
Moderne Methoden der Charakterisierung von Grenz- flächen und Kolloiden 2 SE	Möhwald Miller
Optical Spectroscopy and Photonics II 2 V	Neher Regenstein
Physikalische Chemie zweidimensionaler Systeme 2 V	Möhwald
Polymerchemie II 2 V	Antonietti
Praktikum zur Kolloidchemie I und II 4 PR	Koetz Kosmella Tiersch
Spezialpraktikum PR (4 Wochen)	Koetz Kosmella
Spezielle Aspekte der Polymersynthese 2 V	Laschewsky Lutz Strehmel Antonietti
Technische Chemie 2 V	Laschewsky
Technische Chemie II 1 V	Laschewsky