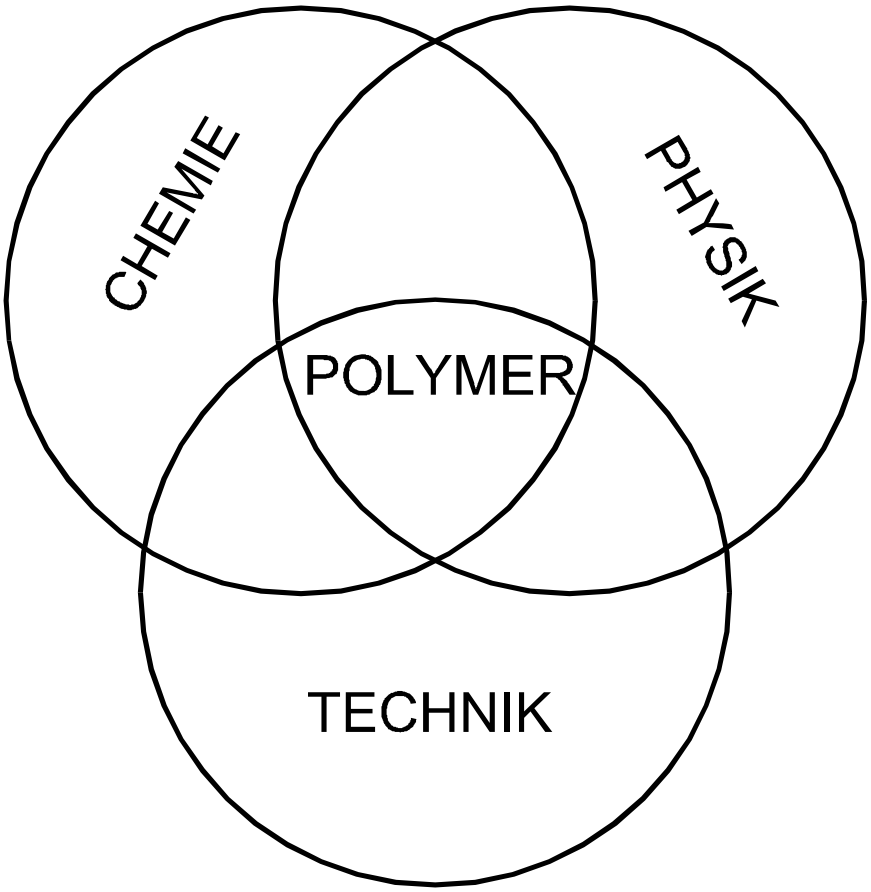
Berlin-Brandenburgischer Verband
für Polymerforschung e.V.



Annual Scientific Report

Bericht über die wissenschaftlichen Aktivitäten

2001

Content

Preface

The most obvious innovation of this 15th Annual Report of the BVP has recently been decided by the members: To present the report in English. This shall facilitate its use by our foreign partners, as a source of information about the polymer scenery at Berlin and its neighbourhood. In order to avoid confusion, the names of the participating institutions will be cited in their german version only. It was also agreed, by unknown reasons, to keep the preface in German. You should by no means assume that matters of only local or internal importance follow.

Wie in den Vorjahren wird dieser Bericht auf der umseitig genannten Homepage des BVP im Internet (WWW) zu finden sein.

Im Web können Sie außerdem unter

http://www.polydays2002.tu-berlin.de

alle Informationen über die Polydays 2002 (früher Berliner Polymeren-Tage) nachlesen, die vom 30. Sept. bis zum 2. Okt. 2002 an der Technischen Universität Berlin stattfinden werden.

Im Sommersemester 2002 soll der Master-Studiengang „Polymer Science“ durch einen externen, von den Ländern Berlin und Brandenburg berufenen Beirat evaluiert werden. Deshalb gibt es die nächste Information über den Studiengang (nach hoffentlich positiver Evaluierung) erst im nächsten Bericht.

Wie immer ist die Dokumentation der wissenschaftlichen Aktivitäten der Mitglieder und natürlich auch ihrer Diplomanden und Doktoranden die vorrangige Aufgabe dieses Jahresberichtes. Dies erfolgt, auch wie immer, in vergleichsweise spartanischer Einfachheit und mit hohem Wiedererkennungswert.

Im Berichtsjahr konnten die Herren Laschewsky (Univ. Potsdam/IAP Golm) und Scherf (Univ. Potsdam) als ordentliche Mitglieder und Schenk (früher BASF Ludwigshafen) als korrespondierendes Mitglied gewonnen werden.

Möge dieser Bericht sich als nützliche Informationsquelle erweisen, bei Vielen das Interesse an der Arbeit des Verbandes wecken und insbesondere Außenstehende zur Zusammenarbeit mit den Mitgliedern des Verbandes veranlassen.

M. Hennecke, BAM

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

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Research Interests of the Regular Members of the BVP

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 toutes amphiphilic block copolymers, doulbe 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
Lehrstuhl Physik kondensierter Materie, Institut für Physik

The main topic of our research is the „Solid State Physics of Functional Nano-Structured Organic Layers and Interfaces“ 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 microsensorics (pyroelectricity, resistive humidity measurements, optical detection of metal ions)
- Molecular electronics (molecular switches, rectifier, interface)

Equipment for research and development:

- Fabrication of ordered film architectures:
  - Organic molecular beam deposition system (OMBD) (LEED, RHEED, MS, Auger spectroscopy, UHV-STM)
  - Langmuir-Blodgett laboratory (clean room), (BAM, Kelvin technique, ADSA technique)
  - spin-coated films, dipped films, self-assembled films
  - molecular modelling
- Structure characterization of ordered films:
  - X-ray diffractometry, UV-VIS and IR spectroscopy, microscopy (polarization, fluorescence), AFM/STM, ellipsometry
  - interface rheology
- Preparation of substrates and metalization:
  - evaporation and sputter devices, bonding machine, scribing machine, electron beam exposure
- AFM/STM laboratory:
  - atomic force microscope TMX2000 (Topometrix)

  - atomic force microscope AUTOPROBE CP (Park Scientific)
  - atomic force microscope UNIVERSAL (Park Scientific)
  - conducting-probe atomic force microscope CSM

- 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: DSC, TGA

- Utilization of large systems (DESY II, HASYLAB)
  - NEXAFS, synchrotron radiation, UPS

- Sensor laboratory:
  - gas mixing technique
  - humidity chamber

Selected research main topics

- Nano-photo science: optically induced switching processes (NLO, cascading)
- OLED: polarization, nanostructuring
- electro-optical effects
- charge transport in unordered systems (MC simulation, stochastic transport)
- membranes: modular ultrathin separation phases
- microsensorics (humidity, IR)
- molecular electronics (switching)

Prof. Dr. Wolfgang Bruns (retired)

Technische Universität Berlin
Macromolecular and Theoretical Chemistry

The solution of those problems was pursued that could not be finished, while the author was in the professional life. The main subject is the determination of the dependence of the architecture of polymer coils in solution on the concentration.

Dr. Ulrich Buller

Fraunhofer-Institut für Angewandte Polymerforschung

The research and development of the Fraunhofer-Institute for Applied Polymer Research is divided into 4 research divisions:

Research division 1 »Natural polymers«
(compare research areas Dr. Hans-Peter Fink)

Research division 2 »Functional Polymer Systems«
(Dr. Ulrich Buller)

The research division »Functional Polymer Systems« is primarlary working 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 are used for surface modification on equipment ranging from the laboratory scale up to the pilot scale.

Polymer Photo Chemistry
Fields of research are the development of optical and photosensitive functionalized materials and the development of processes for the light-induced formation of devices. Topics are laser photochemistry, holography, photochemical modification of interfaces as well as photochemistry and spectroscopy with polarized light. Anisotropic and supramolecular systems will be developed using self-organization processes, molecular photoreactions, light-induced orientation and diffusion processes for applications in the optical data storage, the formation of optical components for the light modulation such as holographic volume gratings and surface relief gratings, in the sensoric, for photoalignment of liquid crystals and printing technology.

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 crystalls can be adjusted according to the requirements of specific applications

Research division 3 »Synthesis and Polymer Technology«
(compare research areas Dr. Gerald Rafler)

Research division 4 »Water-born Polymer Systems«
(compare research areas Dr. Werner Jaeger, Professor André Laschewsky)

Prof. Dr. Gerhard H. Findenegg

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

Research is focussed at the structure and properties of *complex liquids* (surfactants, amphiphilic block copolymers, polyelectrolytes) in bulk and confined geometries, and at interfaces. We are also studying the role of surfactants and block copolymers as structure-directing agents to produce mesoscopically ordered inorganic-organic composites, and the phase behavior of pure substances and mixtures in nanoporous solids.

Surfactant and polymer systems

- The size and shape of micellar aggregates of surfactants or block copolymers in solution, and the structure of lyotropic phases of these amphiphiles is studied by scattering techniques (SAXS, SANS, SLS/DLS), and the results are correlated with the macroscopic properties of these systems (with T. Hellweg).
- Adsorption layers and surface aggregates of amphiphilic molecules adsorbed from aqueous solutions at the free surface and at solid/liquid interfaces are investigated by X-ray and neutron reflectometry, and grazing-incidence diffraction (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 (R. v.Klitzing).
- Ellipsometry is used to study structural aspects of liquid/liquid interfaces on a mesoscopic scale (critical adsorption, incipient wetting layers, phase-separated colloid-polymer suspensions).

Confinement effects in nanopores

Mesoporous silica materials with hexagonally ordered arrays of cylindrical pores of uniform size (3–12 nm) are synthesized by sol-gel processes (using surfactants and block copolymers as templates), and the pore walls can be chemically functionalized. These materials are used to study confinement effects on the phase behavior:

- Freezing and melting in pores (using DSC), pore condensation (using gravimetric and volumetric adsorption techniques in a wide temperature and pressure range)
- Adsorption and surface aggregation of surfactants in pores (using adsorption calorimetry)
- Microphase separation of liquid mixtures in the pore space (using SANS)

Further information: **http://www.tu-berlin.de/~insi/ag_findenegg/**

http://www.tu-berlin.de/~sfb448/

Dr. habil. Hans-Peter Fink

Fraunhofer-Institut für Angewandte Polymerforschung
Natural Polymer Division

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

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

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

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

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

http://www.iap.fraunhofer.de

Prof. Dr. Jörg Florian Friedrich

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

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 (polymer 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”

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)
Vice-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.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://wwwitp.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
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 variing electro-chemical and molecular parameters; polymeric surfactants; reversible and irre-versible 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 seperation 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
Colloid Chemistry

Synthesis and characterization of well-defined polyelectrolytes
The property-profile of cellulosic ethers was changed by variation of the substitutes` distribution on the anhydroglucosic ring and along the backbone, respectively (cooperation with the University of Jena). Regioselective and block-wise substituted carboxymethylcelluloses were characterized physicochemical.

Copolymers of N-vinylacetamide with acrylic acid as well as diallyldimethylammonium chloride were synthesized in order to come to aqueous soluble anionic and cationic polyelectrolytes (PEL) of different charge density.

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). The mechanism of the interaction and multiple reloading of colloidal particles in presence of polyelectrolytes are discussed.

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. However, this opens a way to come to liquid crystalline systems. 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.

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.

Prof. Dr. Gerhard Koßmehl (retired)

The scientific projects at Freie Universität Berlin are partly finished or are in the last phase.Results not yet published are under work and will be completed for publication.

Aim of research have been and are new synthetic routes to macromolecular organic materials in order to create new or modified polymers , that are characterized in relation to their chemical structures and tested for interesting properties in science and technique.

Topics of research:

- Electrical conductive materials
- Liquid crystalline polymers
- Hydrogels and other polymers in ophthalmic medicine
- Modification of polymer surfaces
- Reactive polymers - Reactions on and with polymers
- Sensors on the basis of enzyme electrodes
- Polymers in agriculture.

Within the scope of WiTeBü Berlin are offered chemical and chemical technical consultations and examinations as well as popular-scientific presentations (lectures, sseminars and arrangements) for the information of non chemists in general chemical problems in everyday life. Topics are fundamental biochemistry, organic and macromolecular chemistry, material sciences and environmental problems.

Prof. Dr. André Laschewsky

Fraunhofer-Institut fürAngewandte Polymerforschung und
Universität Potsdam
Institute of Chemistry, 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.-Ing. Werner Mielke

Bundesanstalt für Materialforschung und –prüfung
Division VI.1 “Durability of Polymeric Materials”

The division is part of the department VI “Performance of Polymeric Materials” Its tasks are

- Investigation of the resistance of engineering and functional polymers to chemical, thermal and photochemical attack
- 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
- Investigation of damages caused by deterioration of engineering plastics by ageing
- Development, production and certification of elastomeric reference materials

Current projects

- Resistance of geopolymers against hydrolytic and oxidative attack
- Chemical resistance of polymers used as packaging materials for the transport of dangerous goods
- Thermal analysis of polymers
- Combustion behaviour of polymers
- Thermoluminescence of polymers
- Photochemical ageing of polymeric materials
- Cure-monitoring of thermosets and rubber
- Crosslink density of technical elastomers

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.”), see http://www.drg.bam.de

Prof. Dr. Dieter Neher

Universität Potsdam
Lehrstuhl für Experimentalphysik

Electroluminescence Devices
Light-emitting diodes with linearly-polarized emission, light-emitting diodes with circularly-polarized emission, polyfluorene-based LEDs.

Electrooptical Devices based on Aligned Polymer Layers
Polarization-sensitive photodiodes, alignment of polymer liquid-crystals by ultrathin photoaddressable polymers.

Polymer Composite Devices
Polymer based solar cells, polymer blend emission layers, polymer nanoparticles.

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

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

Fluorescence and Raman Spectroscopy
Orientation of liquid crystals, polarized emission spectroscopy, determination of order parameters

Prof. Dr. Dieter Paul

GKSS-Forschungszentrum Geesthacht GmbH
Institut für Chemie Geesthacht/Teltow

Interdisciplinary research on membranes for separation applications is allocated to the research topics reaction and separation technology and medical technology within the program of the Hermann von Helmholtz Association of German research centres. The Institute of Chemistry of GKSS is unique in its research and development activities in membranes and separation technology. Neither in Germany nor abroad is the fundamental research from separation material development to application testing in close collaboration with industry carried out this consequently. Competent staff and suitable and advanced equipment are important pre-conditions for interdisciplinary research. This structure furthers the development of new solutions for separation problems in process-, energy-, environmental-, bio- and medical technology. The increasing interconnection of the research areas

- molecular modelling of material structures and transport processes
- synthesis, modification and analysis of separation materials
- fabrication and characterization of membranes
- development of membrane modules and reactors
- process development and simulation
- operation of pilot and demonstration plants

supports the development of specialized, highly effective separations and their use in specifically designed plants. The use of membranes in process technology is concentrated on the subject areas:

- membrane reactors
- membranes for fuel cells
- water processing
- hybrid processes
- natural gas conditioning
- process and flue gas treatment.

Membrane relevant subjects in bio- and medical technology are:

- biohybrid systems with organ supporting functionality
- bioprocess technology with a focus on enzyme membrane reactors.

Broadly focussed basic research activities, aiming at the increase of competence, is of major importance for successful research into the aforementioned subject areas as well as the generation of innovative solutions. National collaborations, e. g. with the universities of Berlin and Potsdam, Institutes of the Max-Planck-Society, Institutes of the Fraunhofer-Society and the industry and international cooperation as well as GKSS internal support were major factors for the success of research projects carried out by the Institute of Chemistry in its two locations in Geesthacht and Teltow.

Prof. Dr. Burkart Philipp (retired)

Scientific activities in 2001 were centered on finalizing a booklet “80 Jahre Polymer-Kolloidforschung in Teltow-Seehof” together with D. Paul, which was published in May 2001 by the German Colloid Society. Besides this, advisory activities of different kind 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
- 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
- Dynamic Force-Microscopy (SFM) at solid-liquid/gas-interfaces
- Optical Nearfield-Microscopy (SNOM)
- Workstations for Molecular Dynamics-Simulations

Further information: http://www.polymerphysics.de

Prof. Dr. Karl-Heinz Reichert

Technische Universität Berlin
Chemical Reaction Engineering, Polymerization Technology

The following research projects are studied currently:

1. Polymerization of olefins in the gas phase with supported catalysts
   - kinetic studies of single reacting particles by video microscopy
   - fast screening of heterogenous polymerization catalyst by mini reactor technology
   - modelling of kinetcs, molecular weight distribution and particle size distribution

2. catalytic active polymer membranes
   - synthesis and characterization of catalytic active polymer membranes
   - studies of catalytic hydrogenation reactions in membrane reactors

Prof. Dr. Arnulf-Dieter Schlüter

Freie Universität Berlin
Fachgebiet Organische Chemie, Polymersynthese

Our research is in the area of synthetic organic chemistry and is mainly directed towards the synthesis of structurally novel types of mono- and polydisperse macromolecules. Special monomers are designed and synthesized as well as new polymerization procedures are developed to achieve this goal. A wide range of chemistry including main group and transition-metal organics plays a role here. For the new polymerization strategies and procedures it is of utmost importance that they meet the basic criteria for a good polymer synthesis like efficiency and controlled reaction courses. Above all, access to oligomers is necessary, because they are immeasurably valuable as models for structure assignments, and for extrapolating the properties of the respective polymers.

Chemical modification of polymers is also an important aspect in our group, whereby the central question is to which extent a certain modification can be achieved. The group strongly cooperates with physical chemists, physicists, pharmaceutical chemists, spectroscopists, and theoreticians of various nations and institutions in order to determine the properties of the new macromolecules prepared.

Some of the projects being worked on are aimed towards certain structural types which promise to have interesting properties based on materials science or general physical knowledge. This project area reflects the interdisciplinary nature of polymer research, since the selection of target structures requires the interaction of physicists, materials scientists, and chemists. Concrete projects currently being worked on are as follows:

- Polyarylenes (Suzuki polycondensation)
- Dendritic structures with cylindrical shape (dendronized polymers, nanorods, nanoobjects)
- Repetitive syntheses
- Dendrimers with quantifiable polarity gradients and for cancer research
- Buckyboards and buckybelts (double-stranded, cyclic aromatics)
- Shape-persistent macrocycles
- Two-dimensional networks

Prof. Dr. Reinhard Schomäcker

Technische Unviersität Berlin
Fachgebiet Technische Chemie

Reaction Kinetics in Multiphase Systems
Determination of micro and macro kinetic parameters and development of models for desciption of reactions in micellar solutions, emulsions and microemulsions. For kinetic investigations conventional and relaxation methods are used.

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 homogenous and heterogeneous catalyses can be combined.

Reaction Engineering for Production of Nanoparticles in Microemulsions
The development of procedures for sythesis of nanoparticles in microemulions requires the detailed understanding of this complex process of particle formation in a micro-heterogeneous media. The mechanism was found to be very similar to that of emulsion polymerization.

Development of Reactive Membranes based on Polymer-Metal-Compound Systems
This research is a cooperation of the working groups Reichert and Schomäcker and is a project within Sfb 448 “Mesoscopic structured compound systems”.

Molecular Imprinting
Imprinting of suitable template molecules in polymer networks enables the production of artificial enzymes and antibodies which are remarkably more durable than their natural analogues. Especially, catalytically active, molecularly imprinted synthetic materials are produced in different configurations, such as ground particles or membranes, and they are examined according to the aspects of reaction engineering. Moreover, imprinted polymers can also be used as stationary phases in chromatogaphy.

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

Syntheses of heat resistant polymers and preparation of fibers, membranes and ultra thin films

Syntheses of high performance polymers for applications in nanotechnology, micro-system technology, and microsensorics

Preparation and characterization of highly ordered layers based on substituted aromatic oxadiazoles and polyoxadiazoles by vacuum deposition methods, Langmuir-Blodgett technology and self assembling techniques

Development of new synthetic routes for 1,3,4-oxadiazoles

Polymerization and chemical modification of side chain polymers as photo-active materials for data storage or as sensitive materials

Preparation and processing of electrically conductive polymers

Investigation of the structural, spectroscopic and optical behavior of organic materials under ultrahigh pressure

Preparation of oxadiazole crystals and characterization of their non-linear properties as well as their liquid-crystalline behavior

In co-operation with the Institut für Dünnschichttechnologie und Mikrosensorik Teltow (http://www.idm-teltow.de) : Syntheses of new polymers as sensitive materials for gas analysis; polymer characterization by GPC, surface characterization by AFM and Contact Angle measurements,

Prof. Dr. Jürgen Springer (retired since 1st of April 2000)

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. Characteriza-tion of surfaces by electrokinetic measurements. Influence of surrounding gases on the interfacial tension of polymer liquid crystalls.

*) The experimental investigations within these research fields are finished resp. will be finished in the next future.

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 m^2, 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:

- 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.
- 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)
- Rheology of polymer melts and solutions, development of rheological constitutive equations, analysis and optimisation of polymer engineering processes
- 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
- Development of polymer-metal precursors for high temperature super conductive films

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

Guest Lectures (Berliner Polymeren-Colloquium)

2001-04-06	Prof. Dr. Bozena **Hilczer**, Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland Dielectric relaxations in heterogeneous systems: Ferro-electric polymer relaxors and composites University of Potsdam
2001-06-13	Dr. Rainer F. **Mahrt**, IBM Zürich Research Laboratory, Rüschlikon, Switzerland Lasing and microcavity effects of pi-conjugated model compounds University of Potsdam
2001-07-11	Prof. Dr. Klaus **Lunkwitz**, Institute of Polymer Research, Dresden On the modification of fluoropolymers University of Potsdam
2001-11-01	Prof. Dr. Jochen **Feldmann** Soft shell, hard core: Experiments with functionalised nanoparticles Magnus-Haus, Berlin
2001-11-29	Prof. Dr. Ullrich **Scherf** Materials for polymer electronics University of Potsdam

Conferences and workshops

Training course: "Thin organic Films"

Date:	05.-09. March 2001
Place:	Universität Potsdam
Organizer:	Physik kondensierter Materie, Institut für Physik Interdisziplinäres Forschungszentrum *„Dünne Organische und Biochemische Schichten"* **(IFZ-DOBS)** J. Reiche, B. Schulz, L. Brehmer
Participants:	16 students/Ph.D. students
Topics:	One week training course for students and PhD-students in the field of fundamentals of the preparation and characterisation of thin film layers and architectures.

Spring EUROLED-Meeting

Date:	05.-06. April 2001
Place:	Rüschlikon Zurich, Switzerland
Organizer:	IBM, Zurich Research Laboratory, Rüschlikon, Switzerland Physik kondensierter Materie, Institut für Physik, Univ. Potsdam S. Schrader, W. Rieß
Participants:	34 scientists
Topics:	During the EUROLED Spring meeting 2001, the reports on the group activities were given by the leaders of each participant team. The contributed talks given by the young researchers were focused particularly on the synthesis, structure and characterisation of new molecules for Organic Light Emitting Devices

Golden Jubilee Meeting of the German Society of Rheology (DRG)

Date:	14.-16. May 2001
Place:	Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin
Organizer:	German Society of Rheology, BAM Division VI.1 W. Mielke

5th Meeting of MALDI-TOF Users

Date:	14.-16. May 2001
Place:	Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin
Organizer:	BAM Division VI.3: Analysis and Structure of Polymers S. Weidner

XXIInd Colloquium of Danubian Countries on Natural and Artificial Ageing of Polymers

Date:	17.-18. Sept. 2001
Place:	Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin
Organizer:	BAM Division VI.1 Durability of Polymeric Materials W. Mielke

Final EUROLED-Meeting

Date:	11.-12. October 2001
Place:	Universität Potsdam
Organizer:	Physik kondensierter Materie, Institut für Physik, Univ. Potsdam S. Schrader, L. Brehmer
Participant:	32 scientists
Topics:	During the EUROLED Final meeting 2001, the reports on the group activities were given by the leaders of each participant team and they were focused on the activities performed by the teams during the 4 years of the project. The contributed talks given by the young researchers covered a broad range due to themultidisciplinary aspect of the EUROLED network. Therefore the topics were different and representing also particularly interesting and new results achieved by the teams: synthesis and growth of new molecules, characterisation by means of techniques like optical spectroscopy, ultraviolet photoelectron spectroscopy, Brewster Angle Microscopy, device physics of Organic Light Emitting Devices, Circularly Polarized Electroluminescence and organic solar cells.

Tutoral Day: Organic Electronics

Date:	17. Nov. 2001
Place:	Universität Potsdam
Organizer:	Physik kondensierter Materie, Institut für Physik, Univ. Potsdam S. Schrader
Participants:	66 scientists
Topics:	- Fundamental Device Physics of Organic Semiconductors - Organic Semiconductor Lasers - Organic Semiconductor Microcavities - Photophysics of Conjugated Organic Materials - Organic Photovoltaics - Self-organised Polymer Transistor Circuits

Workshop: "Hopping Transport in Organic Solids"

Date:	17. Nov. 2001
Place:	Universität Potsdam
Organizer:	Physik kondensierter Materie, Insitut für Physik, Univ. Potsdam J. Stephan, F. Albrecht, L. Brehmer
Participants:	34 scientists (international audience)
Topics:	Analytical and simulational description of charge transport in oganic solids via hopping - charge injection - Time-of-flight-experiments and interpretation of results - Polaronic effects - Monte-Carlo simulation of 2-D and 3-D transport - Influence of disorder (spatial and energetic) - Determination of hopping parameters

European Conference on Organic Electronics and Related Phenomena 2001 (ECOER`01)

Date: 18.-21. Nov. 2001
Place: Universität Potsdam
Organizer: Interdisziplinäres Forschungszentrum *„Dünne Organische und Biochemische Schichten“*
Physik kondensierter Materie, Institut für Physik, Univ. Potsdam
Experimentalphysik, Institut für Physik
S. Schrader, B. Schulz, L. Brehmer, D. Neher
Participants: 150 scientists
Topics: Design, synthesis, processing and characterisation of novel organic functional materials for electronic and optical applications
- Charge injection and transport mechanisms
- Energy transfer in molecular systems
- Theoretical modelling of materials and devices
- Organic light-emitting devices and displays
- Organic transistors and integrated electronics
- Organic solar cells
- Organic amplifiers and lasers

Ph. D. students-Workshop “Functional Nanostructures and Interfaces”

Date: 22. Nov. 2001
Place: Universität Potsdam
Organizer: Interdisziplinäres Forschungszentrum „*Dünne Organische und Biochemische Schichten“*
Physik kondensierter Materie, Institut für Physik, Univ. Potsdam
B. Schulz, L. Brehmer
Participants: 25 Ph.D. students
Topics: - Supramolekulare Architekturen
- Organische und Biomoleküle an Grenzflächen
- Funktionsmaterialien in dünnen Schichten
- Synthese und Charakterisierung organischer Funktionsmaterialien
- Nanostrukturen, Nanopartikel, Mikrosensorik, Molekularelektronik
- Biosensorik, Bioelektronik, Molekulare Erkennnung
- Physik und Chemie von Grenzflächen, Dünnschicht-Techniken, Strukturcharakterisierung, Membranherstellung und -modifizierung

Scientific Activities of the Regular Members

Publications

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

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Freie Universität Berlin (2001)

Christine Selbmann (J. Springer, G. Heppke)
Thermo-elektrooptische und thermo-optische Effekte in Flüssigkristallen mit Glaszustand
Technische Universität Berlin

Mirsad Selimovic (J. Springer)
Synthese und Charakterisierung von Polylysinderivaten für die Anwendung in der Röntgendiag-nostik
Technische Universität Berlin

Lijin Shu (A.D. Schlüter)
Dendronized Polystyrene: Synthesis, Characterization, and SFM Investigation of Cylindrical Nanoobjects
Freie Universität Berlin

Bernd Smarsly (M. Antonietti)
Charakterisierung poröser Materialien mit Methoden der Kleinwinkelstreuung
Universität Potsdam und MPI KGF

Paul Steffen (H. Möhwald)
Rheologie und Benetzung in Langmuir-Filmen auf Mikrometerskala
Universität Potsdam und MPI KGF

Randolf Teppner (H. Möhwald)
Adsorptionschichten an fluiden Grenzflächen: Skalengesetze und Ionenverteilungen
Universität Potsdam und MPI KGF

Franca Tiarks (M. Antonietti)
Neue Strukturen und Snythesen durch die Miniemulsionspolymerisation: Polyaddition, Nanokapseln und Hybridpartikel
Universität Potsdam und MPI KGF

Mirjam Willert (M. Antonietti)
Prinzipien und Anwendungsmöglichkeiten nichtwässriger und inverser Miniemulsionen
Universität Potsdam und MPI KGF

Knut Zöllner (K.-H. Reichert)
Modellierung der Gasphasenpolymerisation von Butadien basierend auf Experimenten in der gerührten Schüttung und am Einzelpartikel
Technische Universität Berlin

Habilitationen

Helmut Cölfen (M. Antonietti)
Biomimetic mineralisation using hydrophilic copolymers: Synthesis of hybrid colloids with complex form und pathways towards their analysis in solution
Universität Potsdam und MPI KGF

Andreas Thünemann (M. Antonietti)
Self-Assembly, Ordered Nanostructures und Functionality of Polyelectrolyte-Amphiphile Complexes
Universität Potsdam und MPI KGF

Patents

W. Albrecht, T. Weigel, H.-J. Ziegler, R. Hilke, D. Paul
Verfahren zur Herstellung von funktionalisierten Polymeren aus Polyimiden
Amtliches Aktenzeichen: 101 11 663.2-43, angemeldet am 9. März 2001

W. Albrecht, T. Groth, K. Lützow, B. Seifert, R. Hilke, D.Paul
Asymmetrisch funktionalisierte Polyimidmembran, Verfahren zu deren Herstellung und deren Verwendung als Trägermembran für Biohybridorgane
Amtliches Aktenzeichen: 101 11 664.0-43, angemeldet am 9. März 2001

W. Albrecht, L.-I. Dahms, K. Lützow, T. Weigel, R. Hilke, D. Paul
Funktionalisierte Polyimid-Formkörper und funktionalisierte Polyimid-Membranen
Amtliches Aktenzeichen: 101 11 665-9-4, angemeldet am 9. März 2001

W. Albrecht, T. Groth, K. Lützow, B. Seifert, R. Hilke, D. Paul
Amin-funktionalisierte Polyimid-Membran, Verfahren zu deren Herstellung und deren Verwendung zur Pyrogenabtrennung
Amtliches Aktenzeichen: 101 11 666.7-43, angemeldet am 9. März 2001

W. Albrecht, T. Weigel, R. Hilke, D. Paul
Verfahren zur Herstellung von Polymermembranen und Polymermembran
Amtliches Aktenzeichen: PCT/DE 01 03196, angemeldet am 21. Aug. 2001

W. Albrecht, T. Weigel, T. Groth, B. Seifert, R. Hilke, D. Paul
Zweischicht-Hohlmembran für Bioreaktoranwendungen
Amtliches Aktenzeichen 101 34 447.3, angemeldet am 16. Juli 2001

L. Brehmer, S. Schrader, U. Schülke, P. Neumann
Lichtemittierende Vorrichtung und Verfahren zu ihrer Herstellung

L. Brehmer, B. Stiller, P. Karageorgiev, H. Orendi
Verfahren und Vorrichtung zur hochaufgelösten Detektion von Materialeigenschaften mit Hilfe von polarisierten Licht

R. Hilke, W. Albrecht, T. Weigel, T. Groth, D. Paul
Membranformkörper sowie Verfahren zur Herstellung desselben
Amtliches Aktenzeichen 101 38 319.3, angemeldet am 10. Aug. 2001

E. Kempin, B. Orlich, K.-H. Reichert, R. Schomäcker
Verfahren zur Herstellung einer Reaktivmembran
DE 199 43 728 A1 , 8. März 2001

A. Yasuda, W. Knoll, A. Meisel, T. Miteva, D. Neher, H.-G. Nothofer, U. Scherf
End-capped polyfluorenes, films and devices based thereon
EP 1 149 827 A1

Awards

Reimund Gerhard-Multhaupt and Matthias Schuke
First Prize, Technology Transfer Award 2001 of the Technology Foundation Brandenburg
for "innovative design methods for the construction of musical instruments through the analysis of their vibration behaviour".

Reimund Gerhard-Multhaupt and Matthias Schuke
Adalbert-Seifriz Award 2001 of the Association Technology Transfer in Crafts
for "an outstanding and exemplary cooperation between manufacturers and scientists".

Offer

Prof. Dr.-Ing. R. Gerhard-Multhaupt
Chair of Materials Science in Electrical and Electronic Engineering at the Technical University of Vienna, Austria

Lehrveranstaltungen

Classes which were held as part of the Master of Science in Polymer Science curriculum of the FU Berlin, HU Berlin, TU Berlin, and U Potsdam are indicated by "MSPS"

Technische Universität Berlin

Sommersemester 2001

Rheologie der Polymerschmelzen I 2 V, 2 UE	Wagner
Kunststoffverarbeitung II 2 V, 4 PR	Wagner, Rautenberg
Konstruieren mit Kunststoffen II 2 V, 2 UE	Wagner, Wache
Kunststoffe im Bauwesen 2 V, 2 PR	Rautenberg
Rechnergestützte Entwicklung und Konstruktion von Kunststoffprodukten II 2 V, 2 UE	Bolst, John
Kunststoffrecycling 2 V	Wagner Tartakowska
Polymerphysik II 2 V	H. Springer
Physikalische Eigenschaften der Kunststoffe 2 V, 1,5 UE, PR	Springer, Wagner
Kunststoffprüfung 2 V	Mielke, Hentschel
Polymerwissenschaftliches Seminar 2 SE	Wagner, Rautenberg, Springer
Surface Science of Polymers 2 V, 2 UE	Findenegg v. Klitzing

Wintersemester 2001/2002

Herstellung, Verarbeitung und Anwendung der Kunststoffe 2 V, 1 UE, PR	Wagner H. Springer
Rheologie der Polymerschmelzen II 2 V, 2 UE	Wagner
Kunststoffverarbeitung I 2 V, 4 PR	Wagner Rautenberg
Rechnergestützte Entwicklung und Konstruktion von Kunst-	Bolst, John

stoffprodukten I 2 V, 2 UE	
Polymerization Technology 3 V (MSPS)	Reichert
Current Topics of Colloid and Interface Science 2 V	Findenegg, Hellweg, v. Klitzing
Kolloquium des Sfb 605 Elementarreibereignisse 2 V	Hess

Freie Universität Berlin

Wintersemester 2001/2002

Introduction to Macromolecular Chemistry 2 V (MSPS)	Schlüter
Basic Polymer Synthesis 3 V (MSPS)	Schlüter
Physical Chemistry of Polymers 1 V (MSPS)	Hennecke

Universität Potsdam

Sommersemester 2001

Organic Semiconductors 2 V	Neher
Physical and Engineering Properties of Polymers 2 V (MSPS)	Gerhard-Multhaupt, Neher
Kolloidchemie II 2 V	Kötz
Kolloidchemie II 1 SE	Kosmella
Polymerchemie I 2 V	Scherf
Physikalische Chemie der Grenzflächen 2 V	Kötz, Vollhard
Spezialpraktikum PR (4 Wochen)	Kötz, Kosmella

Angewandte Polymerchemie 2 V	Scherf, Buller
Moderne Methoden der Polymersynthese 2 V	Scherf, Antonietti
Projektlabor Dünne organische Schichten 1 V, SE	Reiche, Brehmer u.a.
Dünne Schichten und Grenzflächen – Herstellung und Charakterisierung 2 V	Schrader, Brehmer
Nichtlineare optische Eigenschaften organischer Materialien 2 V	Schrader, Brehmer
Oberseminar: Nanophysik - Organische Grenzflächen und dünne Schichten 2 SE	Brehmer
Doktorandenseminar: Nanophysik 2 SE	Brehmer
Polymers as high tech materials 2 V	Schulz
Polymerchemie I 2 V	Antonietti
Strukturbildung in kolloidalen Systemen 2 V	Kötz, Antonietti
Colloidal Phenomena 2 V	Kötz, Antonietti

Wintersemester 2001/2002

Experimental Physics I: Mechanics and Acoustics 4 V	Neher
Molecular Systems and Structure Formation 2 V, 2 P	Möhwald, Neher Pietsch, Gerhard-Multhaupt
Selected Subjects of Experimental Physics 2 SE	Neher
Membranes and Separation Processes 1 V MSPS	Paul

Kolloidchemie I 2 V	Kötz
Kolloidchemie I 1 SE	Kosmella
Polymerchemie II 2 V	Scherf, Antonietti
Moderne Aspekte der Kolloidforschung 2 V	Kötz, Antonietti
Spezielle Aspekte der Polymersynthese 2 V	Scherf
Physikalische Chemie zweidimensionaler Systeme 2 V	Möhwald
Praktikum zur Kolloidchemie I und II	Kötz, Kosmella
Grundlagen der Festkörperphysik I 2 V, 1 Ü	Reiche, Schrader, Brehmer
Projektlabor Dünne organische Schichten	Reiche, Brehmer, u.a.
Polymerchemie II 2 V	Antonietti
Moderne Aspekte der Kolloidforschung 2 V	Kötz, Antonietti
Supramolecular Chemistry 2 V (MSPS)	Antonietti, Peter

Humboldt-Universität zu Berlin

Wintersemester 2001/2002

Eigenschaften supramolekularer Strukturen 2 SE	Rabe, Röder
Polymer Characterization 4 V, 2 SE (MSPS)	Rabe, Samori
Struktur und Dynamik von Makromolekülen 2 V	Rabe
Kolloquium zur Makromolekül- und Vielteilchenphysik	Rabe, Wolf