JENA

Located in the green heart of Germany (state of Thuringia), Jena is a city of approx. 110.000 inhabitants, embedded in the valley of the Saale river. After the political revolution in East Germany, Jena is a modern lively place again offering the atmosphere of an old university town and a place of innovative research and industry combining an active student life and a beautiful country side.

Despite of being partly destroyed during World War II, Jena is full of historical buildings. Founded in the 13th century, it accommodates one of the oldest universities in Germany (since 1558). The Friedrich-Schiller-University of Jena has played an important role in the mental revolution of Germany, in particular in the 18th and 19th century when famous philosophers and writers, such as Goethe and Schiller, taught as professors. The city went through many changes. In particular after GDR and the coming down of the wall, the city showed a phenomenal tendency to become one of the most democratic and innovative cities in Germany (hosting companies such as Jenoptik, Zeiss and Schott). Jena has been the "City of Science 2008" for generating growth from knowledge and was celebrating this award throughout the year with high-profiled events, symposia and conferences.

Surrounded by steep hills, Jena offers a wide range of sports activities. Jogging and mountain biking are the most common ones. Canoeing and joining sports clubs and teams are other options to socialize. Theater, cinemas and cultural associations are working on adding more attraction to the city life with festivals, concerts, and plays. The events and activities are particularly designed to treat the young population. Nightlife starts at the cozy restaurants, serving exclusive cuisine, and moves on to different clubs and bars depending on personal choice.

The Schubert group is running projects in the Laboratory of Organic and Marcomolecular Chemistry (IOMC) at the Friedrich-Schiller-Universität Jena, Germany .

Prof. Dr. Ulrich S. Schubert was born in 1969 in Tuebingen and completed his habilitation at the Technical University Munich in 1999. From 1999 to spring 2000, he held a temporal position as a professor at the Center for Nanoscience at the University Munich. In summer 2000, he became Full-Professor at the Eindhoven University of Technology. Since April 2007, Prof. Schubert holds the chair for Organic and Macromolecular Chemistry at Friedrich-Schiller-University of Jena. In addition, he acts as the director of the Laboratory of Organic and Macromolecular Chemistry, as vice dean of the Faculty of Chemical and Earth Sciences, and directs the research cluster "Innovative Materials and Technologies" at the University of Jena. From June 2011, he is also the coordinator of the DFG priority program "Design and generic principles of self-healing materials". Up to June 2010, he also was in charge of the Laboratory of Macromolecular Chemistry and Nanoscience at the Eindhoven University of Technology. Moreover, he is the founder and scientific chairman of the Technology Area HTE of the Dutch Polymer Institute (DPI).

Currently the Schubert group consists of 29 PhD students, 12 Post-docs and senior scientists, 10 technical supporting staff members and a number of undergraduate students.

The group has published over 500 refereed publications and 18 patents up to August 2011. The group's most recent research studies have been published in *Angewandte Chemie International Edition* (**2010**, *49*, 6288), *Nanoletters* (**2010**, *10*, 4009), *Organic Letters* (**2010**, *12*, 2710), *Macromolecules* (**2010**, *43*, 927 & 2759 & 4098 & 4654; **2011**, *44*, 4057 & 4320), *Chemical Communication* (**2010**, *46*, 1296 & 5634 & 6455 & 6651 & 6971), *Advanced Materials* (**2010**, *22*, 5424 & **2011**, *23*, 953), *Soft Matter* (**2010**, *6*, 866 & 994; **2011**, *7*, 3827 & 5030 & 1581) and *Nature Materials* (**2011**, *10*, 176). Among 732.400 chemists worldwide, Prof. Dr. Ulrich S. Schubert is ranked at place 195 (Web of Science) with a h-index of 56.

Parts of the research are carried out within the framework of the Dutch Polymer Institute (DPI). We are constantly seeking for new cooperation partners who want to make use of innovative technologies under the supervision and with the contribution of our highly qualified and motivated scientists.

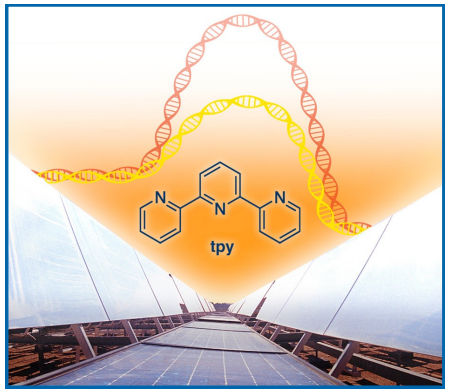
Our current partners are Evonik Industries AG, microdrop Technologies GmbH, and Chemspeed Technologies AG.

JCSM
Jena Center for Soft Matter

seit 1558

Schubert Group

Laboratory of Organic and Macromolecular Chemistry (IOMC)
Friedrich Schiller University Jena, Germany



Tailor-made macromolecules

Drug delivery

Supramolecular chemistry

Inkjet printing

Microwave-assisted reactions

Nanoscience

High-throughput experimentation

Biomaterials

Self-healing systems

Polymer batteries

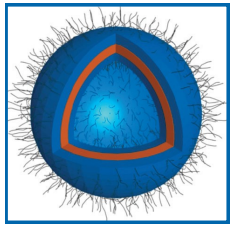
www.schubert-group.com

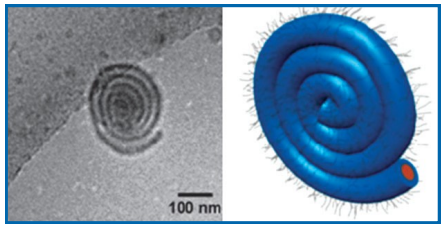
RESEARCH TOPICS

Our laboratories cover a range of research fields between organic synthesis, macromolecular chemistry, supramolecular chemistry, combinatorial material research, nanoscience, and biomaterials.

Tailor-made macromolecules and high-throughput experimentation:

In order to design tailor-made macromolecules, we apply advanced polymerization techniques: living cationic, living anionic and controlled radical polymerization processes. In addition, we use high-throughput experimentation tools to decrease the time and energy spent to reach the goal. We are currently housing several automated synthesis platforms; some of them are coupled to online characterization tools. Currently we target tailor-made block copolymers, multi-compartment and star-shaped unimolecular micelles. The engineering of complex polymer architectures is combined with the special responsive features, such as LCST/UCST behavior, cell-targeting and sensing.

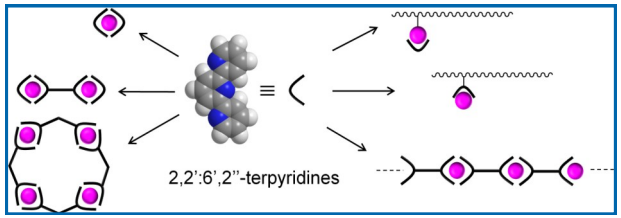




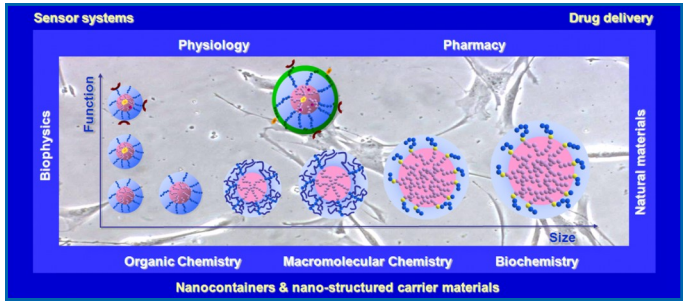
Ref.: *Chem. Commun.* **2010**, *46*, 6455; *Macromol. Rapid Commun.* **2010**, *31*, 2053; *Polym. Chem.* **2010**, *1*, 1669; *Macromolecules* **2011**, *44*, 4320; *Biomacromolecules* **2011**, *12*, 681 & 2591.

Supramolecular chemistry and bio-inspired materials:

Terpyridine ligands form stable symmetrical and unsymmetrical octahedral complexes with a wide range of transition metal ions, supplying a kind of LEGO system for connecting and disconnecting (polymer) blocks *via* metal complexes. Metallo-supramolecular block copolymers, graft copolymers, and chain-extended polymers have been designed and prepared. These macromolecules often feature reversibilty of the complexation and/or rich photophysical properties. Thus, their application as "self-healing materials" or in opto-electronic devices is in the focus of current research.



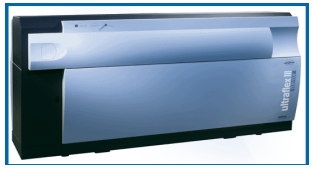
Ref: *Soft Matter* **2009**, *5*, 84 & 1460; *Soft Matter* **2009**, *5*, 84; *Macromol. Rapid Commun.* **2009**, *30*, 565; *Macromolecules* **2010**, *43*, 2759; *Chem. Soc. Rev.* **2011**, *40*, 1459.

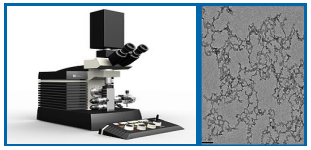


Ref: *ChemBioChem* **2010**, *11*, 649; *J. Histochem. Cytochem.* **2010**, *58*, 929; *J. RNAi Gene Silencing* **2010**, *6*, 422; *Macromol. Bioscience* **2011**, *11*, 535; *Soft Matter* **2011**, *7*, 1581; *ACS Comb. Sci.* **2011**, *13*, 190; *Soft Matter* **2011**, *10*, 5030

Advanced characterization techniques:

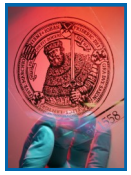
Tailor-made polymers and supramolecular structures require the most advanced characterization tools in order to endorse the excellence of the materials. We are in close contact with the instrument manufacturers to employ state-of-the-art techniques for the characterization of macromolecules. Instruments purchased by us recently include a MALDI-TOF MS coupled with a CID unit and a 2D SEC, electrospray ionization (ESI), an analytical ultracentrifuge, and an asymmetric flow field flow fractionation (AF4).





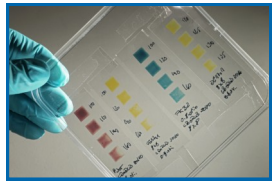
Ref: *J. Mater. Chem.* **2009**, *19*, 222; *Rapid Commun. Mass Spectrom.* **2009**, *23*, 756; *J. Poly. Sci. Part A* **2010**, 48,4375; *Macromol. Chem. Phys.* **2010**, *211*, 677; *Macromol. Chem. Phys.* **2010**, *211*, 2312; *J. Polym. Sci. Part A* **2010**, *48*, 3924; *ACS Comb. Sci.* **2011**, *13*, 218.

Inkjet printing:



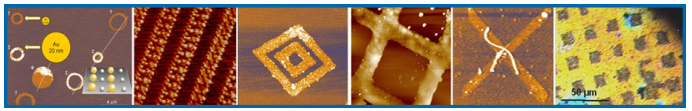
Our group performs basic and applied research in inkjet printing towards fields such as biomaterials, biosensors, printable electronics, polymers, and 3D printing/reactive printing. Also for life-science applications, inkjet-printing is already used for the defined deposition of polymers and active substances, and single cell printing.

Ref: *Adv. Mater.* **2006**, *18*, 2101; *Adv. Mater.* **2008**, *20*, 343; *Soft Matter* **2008**, *4*, 703 & 1072; *Adv. Mater.* **2009**, *21*, 4830; *J. Mater. Chem.* **2010**, *20*, 8446; *Adv. Energy Mater.* **2011**, *1*, 105; *ACS Comb. Sci.* **2011**, *13*, 218.



Nanoscience:

The nano group utilizes surface sensitive characterization techniques, like FT-IR and XPS spectroscopy, to investigate the functionalization of surfaces by polymer coatings and (supramolecular) self-assembled monolayers. The structuring of surfaces by electrochemical oxidation Scanning Force lithography and UV lithography is used to tailor and improve the properties of surfaces. (cryo-)TEM and Scanning Probe techniques are routinely used for the morphological characterization of films and self-organizes supramolecular aggregates in solutions.



Ref: *Adv. Mat.* **2008**, *20*, 345; *Angew. Chem. Int. Ed.* **2009**, *48*, *1732; Nano Lett.* **2010**, *10*, 4009; *Adv. Funct. Mater.* **2010**, *20*, 3252; *Chem. Commun.* **2010**, *46*, 6455; *J. Mater. Chem.* **2011**, *21*, 8532.

JOB OFFERS

► A PhD position on the synthesis and characterization of self-healing polymers based on supramolecular interactions is available. The project is within the German SPP 1568 "Design and Generic Principles of Self-healing Materials" (www.spp1568.uni-jena.de) and is in close collaboration with Prof. van der Zwaag (TU Delft). Applicants with an academic degree in chemistry with emphasis on macromolecular chemistry or organic synthesis (preferably with experience in supramolecular chemistry) are encouraged to send in their application.

► We are seeking for a post-doctoral fellow or a PhD student on the synthesis of polymeric materials for battery applications. These materials can be used for the electrolytes or as active materials in the electrodes of the battery. The project, which is focused on printed thin film batteries, is funded by the BMBF. Applicants with an academic degree in chemistry with emphasis on macromolecular chemistry or organic synthesis are encouraged to send in their application.

► A PhD position on the BMBF project: "Superconductors for energy-related applications (SupraTech)": High temperature superconductive wires will become very important in the next 3 to 5 years, since the price of copper is rapidly increasing. Furthermore, these materials introduce the possibility to increase the current density that goes beyond that of bulk copper. The focus of this research is to inkjet print large areas of functional materials. For this, the inks as well as the substrate need to be optimized: not only the ink composition, but also the drying of the inks and the unwanted coffee ring effect need to be investigated. Furthermore, the inkjet printing of silver nanoparticles will be investigated and the sintering process by using alternative and selective techniques. Qualitifications: Recently finished a Master in chemistry, physics or materials science. Good practical laboratory capabilities, interest and enthusiastic attitude and a good understanding of English.

Please send in your CV together with a motivation letter to inform us about your background, motives, what your input will be to the group and what you want to pursue in your career. Please also include reference letter(s) from your supervisor(s). Please send your applications to: jobs@schubert-group.de

Contact: Laboratory of Organic and Macromolecular Chemistry, Friedrich-Schiller-Universität Jena, Humboldtstrasse 10, 07743 Jena, Germany, Tel.: +49-(0)3641-948201, Fax: +49-(0)3641-948202, e-mail: info@schubert-group.de, www.schubert-group.com

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