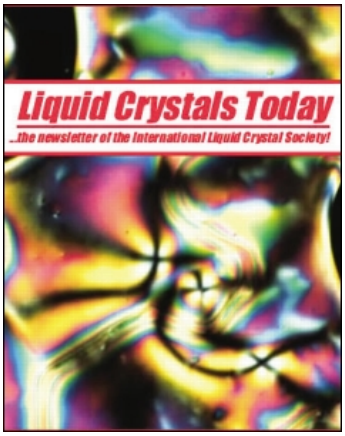

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37th German Topical Meeting on Liquid Crystals

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CONFERENCE REPORT

37th German Topical Meeting on Liquid Crystals

From 1–3 April 2009, the 37th German Topical Meeting on Liquid Crystals took place at the University of Stuttgart. This traditional meeting of the German Liquid Crystal Society dates back to as early as 1971 when the first Freiburger Arbeitstagung Flüssigkristalle started with only five lectures and 30 participants. In the past few years, the meeting was held not only in Freiburg but became hosted annually by different universities all around Germany. This year, 26 lectures and around 41 posters from different countries were presented at the 37th Topical Meeting on Liquid Crystals in Stuttgart.

Figure 1. Group photo of the participants of the German Liquid Crystal Conference 2009. (Photo by C. Hägele.)

The scientific program of the meeting included contributions from various fields of chemistry and physics of thermotropic and lyotropic liquid crystals (LCs), as well as experimental techniques. After the opening ceremony held by the chair of the meeting, Professor Frank Gießelmann (Universität Stuttgart), the first session devoted to the chemistry of LCs started with a contribution by Frank Würthner (Universität Würzburg) about electronic processes in functional dye-based columnar materials. This contribution reflects a fundamental interest in the research into the organisation and nano-architecture of dye molecules with versatile functional properties associated with π-conjugation, which has a wide perspective in the development of smart electronic and photo-functional materials. Such materials are wide spread in nature and play a very important role in the functioning of biological systems such as light-harvesting photosynthetic mechanisms.

Self-organisation into supramolecular structures was extensively discussed in the chemical section: Formation of supramolecular mesogens involving single, double and triple hydrogen bonding between complementary molecular species forming various columnar mesophases was presented by Dietmar Janietz (Fraunhofer Institute, Potsdam). Fascinating self-organised structures formed by star-shaped mesogens consisting of oligoester and oligoamide building blocks were demonstrated by M. Jahr (Chemnitz).

Display and photonic applications were discussed in the afternoon session, which was opened with a talk by Professor Heinz-S. Kitzerow on photoluminescent microresonators embedded in LCs. High sensitivity of the optical properties of LCs to temperature and external fields can be used to induce a spectral shift in the resonance modes, which can be employed in controlling the properties of LC-embedded semiconductors.

An alternative to indium tin oxide (ITO) electrodes for display applications was presented by Eberhard Kurz (Stuttgart) in his talk on twisted nematic (TN) displays with aluminium-zinc-oxide electrodes.

The second day of the Meeting started with the commemoration of Professor Alfred Saupe. There were two commemoration lectures given by Professor Slobodan Zumer (Ljubljana), the current president of the International Liquid Crystal Society, and Professor Harald Pleiner (Mainz). In memory of Professor Saupe, the foundation of the Alfred-Saupe-Stiftung was announced.

The scientific program of the morning session was focused on lyotropic LCs. Studies of kinetics of pressure-jump-induced phase transitions using pressure-jump relaxation and synchrotron radiation techniques were discussed by Roland Winter (Dortmund). Professor Pawel Pieranski (Orsay) presented experimental studies of thermopermeation in bicontinuous lyotropic crystals submitted to temperature gradients.

The afternoon session was devoted to the properties of thermotropic smectic LCs, discussing the structure of the de Vries-type Smectic A (SmA) phases: the talk by Per Rudquist (Göteburg) was particularly interesting. He reviewed the data on the orientational order in the de Vries-type materials which helped him to challenge the popular hollow-cone model. He argued that the behaviour of these materials can be better explained by a conventional 'sugarloaf-like' distribution of the director in the SmA phase.

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Figure 2. Pavel Pieranski demonstrating thermopermeation in bicontineuous lyotropic crystals. (Photo by C. Hägele.)

A field-induced tilt in an achiral SmA phase of bent-core molecules was presented by Stephan Stern (Magdeburg) in his talk 'Quadratic electroclinic effect in smectics formed by bent-core mesogens'. He showed that the tilt of the mesogens can be induced in the SmA phase due to a quadratic coupling between the tilt and the polarisation, favouring sterically-induced polar order in the tilted state.

Figure 3. An 'after-conference evening', enjoyed by participants in one of Stuttgart's pubs after a hard day of scientific sessions.

Two contributions in the evening session presented applications of spectroscopic techniques to the investigation of LCs. In the first talk, Valentina Domenici showed how the magnetic field affects the supramolecular structure of chiral LCs using deuterium nuclear magnetic resonance. In the second talk, an 'exotic' muon-spin-resonance spectroscopy technique was employed to study chiral induction in lyotropics. The second day of the meeting culminated with a marvellous dinner party.

Figure 4. Impressions from a great conference dinner. (Photo by C. Hägele.)

The final day was devoted to liquid crystalline polymers, surfaces and nano-composites. A very interesting phenomenon of shape changes during the isotropic-LC phase transition of spherically shaped particles of LC-elastomers was demonstrated by Christian Ohm (Mainz). He showed that at low temperature elastomer particles that were initially spherical (in the LC phase) reversibly turned into those that were of ellipsoidal shape in the isotropic state. Such behaviour is very important when designing actuator applications.

A macroscopic model to explain non-linear stress–strain behaviour in nematic elastomers was presented by Andreas Menzel (Bayreuth). In his model, he separates the orientation of the director of the mesogenic units from the orientation of the polymer network which is considered as being 'frozen'. This model enables one to compute the strain–stress relation, which is in very good agreement with recently published experimental data.

The last session of the meeting was devoted to surfaces and nanocomposites and included the contributions on molecular organisation on patterned substrates and the effects of nanomaterials in the modification of dielectric properties of ferroelectric LCs.

German Liquid Crystal Meetings have always been arenas for young scientists to share their ideas and experiences, to start their scientific careers. Traditionally, at the closing of the meeting of the German Liquid Crystal Society, the best poster contributions are awarded with a prize. This time, however, two best oral contributions by young scientists were presented with the 'Young Scientist's Award'. From four nominees Ute Dawin and Christian Ohm received the award.

Figure 5. Professor Günter Lattermann (left) presenting the Young Scientist's Awards to Ute Dawin and Christian Ohm.

In conclusion, I would like to thank the organisers of the meeting for a very interesting and stimulating scientific program and a very warm and friendly atmosphere. The next meeting of the German Liquid Crystal Society will be organised at the University of Mainz in Spring 2010.

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