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6th International Symposium on Metallomesogens ISMM 99

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6th International Symposium on Metallomesogens ISMM 99

**Rotenburg a. d. Fulda, Germany
10–13 June 1999**

Report by Daniel Guillon

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The Sixth International Symposium on Metallomesogens was held at the beautiful site of Rotenburg in the valley of the Fulda river in the heart of Hesse (Germany). It provided the forum for the state of the art in this increasing area of liquid crystal research. The symposium was carefully and pleasantly organized by Professor W. Haase and members of his team, namely M. A. Athanassopoulou, K. Falk and R. Werner, Darmstadt University of Technology. The members of the Program Committee and the Symposium Co-Chairs were W. Haase (Darmstadt University of Technology), G. Lattermann (Bayreuth University) and K. Praefcke (Berlin University of Technology).

About 80 participants from 16 different countries presented their contributions (35 oral presentations and 32 posters). D. Bruce gave the first lecture of the symposium and showed how to use a mesophase as a template for the formation of mesoporous silicates. In particular, he presented his results concerning the use of ruthenium (II) complexes in such an approach. The next presentations concerned new enamino-ketone complexes (J. Szydłowska) and some examples of computational methods used to elucidate the structure of complex molecules (D. U. Singer). The ferromagnetic properties of liquid crystals were theoretically discussed by E. I. Kats, and several authors presented further contributions on the magnetic properties of different

metallomesogenic systems, with a discussion of the magnetic interactions involved: quasi-1D ferromagnets (M. Balanda), tetraphenyl porphyrin copper (II) and V=O (IV) complexes (Y. Shimizu), and copper (II) metallopolymers (M. F. Iskander).

Metal containing dendrimers were introduced by J. L. Serrano who presented new results in this field with copper dendrimers based on poly(propylene-imine) ligands, exhibiting a mesomorphic behaviour. This lecture was followed by the presentation of new compounds, like metal complexes of troponoid liquid crystals (A. Mori), and organosiloxane derivatives (T. V. Timofeeva). In this area of new materials, L. Douce presented work on the use of a metallohelicate to promote the formation of a liquid crystalline state at ambient temperature, the synthesis of liquid crystalline polymers prepared for nonlinear optical properties were described by M. Pinol, and an interesting approach to the thermotropic biaxial nematic phase via mixtures of metal complexes has been developed by R. W. Date. Platinum and palladium stilbazoles with lateral chains were also shown by C. Mongin to constitute a new kind of polycatenar liquid crystal.

Another session was devoted to lanthanide containing metallomesogens with a review by K. Binnemans who extended his presentation to include his own results related to the mesophase behaviour of liquid crystalline lanthanide complexes with Schiff base ligands. Then new lanthanide derivatives with cholesteryl ligands (F. Hapiot), with salicylaldimate ligands (F. Martin) along with magnetic properties of mesogenic lanthanides (I. Ovchinnikov) were presented.

The synthesis of new chiral metallocrowns from simple molecular precursors was developed by V. L. Pecoraro, who also showed these complex molecules were thermochromic. Other new liquid crystalline compounds were presented by several authors, dealing with paramagnetic metallomesogens (R. Gimenez), chromium and cobalt complexes with alkyleneamine ligands (G. Lattermann), octahedral cyclometalated liquid crystals (D. Pucci), and also new mixed-valent diruthenium carboxylates which are mesomorphic at room temperature (Z. Chaia).

Some remarkable properties of palladium, platinum and nickel containing mesogens were illustrated by H. S. Kitzerow. In particular, he pointed out the possibility of using such systems for optical storage of information. The collective and molecular processes in discotic mesophases of vanadyl complexes were described and analysed in another lecture presented by S. Wrobel. Other remarkable properties were then presented, such as luminescence properties (R. E. Bachman), the promising photocon-

ductive properties of porphyrin silicon (IV) complexes (T. Sugino), the electrophysical properties of copper phthalocyanine derivatives (N. Usol'tseva), and dielectric properties of metallomesogens (M. R. de la Fuente).

K. Ohta reported on novel alkylthio-substituted phthalocyanines, for which he described their mesomorphic and structural behaviour, and their conductivity properties. In the context of the structure-property relationship in mesogens, N. Hoshino-Miyajima has presented a study on the smectic A/C polymorphism of N-salicylideneaniline derivatives. In the final lecture of the symposium, D. Guillon presented a structural model for the transition between the columnar and cubic mesophases observed in silver (I) complexes, and involving undulations of columns.

In addition, poster presentations took place during two evening sessions where fruitful discussions between the participants contributed to the high scientific level of the symposium. All participants paid compliments to A. M. Giroud who will retire next October. D. Bruce paid tribute to her brilliant scientific career and pointed out her legendary enthusiasm. The celebration was followed by a lecture of A. M. Giroud who presented a summary of

her twenty years of research in the chemistry of metal-containing liquid crystals. K. Praefcke, whose retirement was celebrated last year, also presented a review on the relationship between the molecular design and the columnar stacking of organometallics.

The symposium ended with a general discussion run by G. Lattermann. From the contributions presented, it appeared that the field of metallomesogens is still growing up. It has been pointed out that the future investigations should concern the physical properties (magnetic, photoconductive, electric, etc.) of such materials, their elaboration into thin films and their study with local probe microscopy or freeze fracture for example. The synthesis of new compounds at the interface with biology and in the area of catalysis, and the development of lyotropic systems will present new opportunities.

Let us finish this short report by thanking again the organizers for the wonderful organization of this high level symposium. For those who want to read or download the abstracts of all the presentations, it is possible to obtain them from the web site of the conference at the following address : <http://kondmat.pc.chemie.tu-darmstadt.de/ismm99.htm>.

Workshop on Pattern Formation in Liquid Crystals

**(PFLC'99), 5–7 September 1999 in
Waischenfeld/Bayreuth, Germany**

Report by L. Kramer, University of Bayreuth

This event marked the 10th anniversary of the first workshop on this topic in Bayreuth, which initiated a bi-annual series on pattern formation in complex systems which took place in Kitakyushu, Santa Fe, Copenhagen and Budapest. Some of the topics discussed are reported below (see also www.phy.uni-bayreuth.de/~pflc/).

The many contributions to electroconvection (EC) in nematics demonstrated the continued interest in this subject. The phenomena observed near threshold in the material I52, like spatio-temporal chaos and 'worms' arising subcritically (G. Ahlers and M. Dennin), are now presumably on the way to

being understood (H. Riecke). To do this, the framework of the 'weak electrolyte model' (WEM), which extends the classic Helfrich description of EC to include explicitly the charge carrier dynamics, is called for. On the other hand, the phenomena observed in materials that exhibit a nematic-smectic transition (P. E. Cladis) appear to resist attempts for a quantitative description. During recent years a breakthrough in understanding the behaviour of the traditional materials MBBA and Phase 5 above threshold was achieved by the discovery of 'abnormal rolls', where the director spontaneously rotates out of its usual symmetry plane. This concept comes in naturally in homeotropically aligned cells, but it turns out to be decisive also in conventional planar geometry. It is important also in the dielectric regime and in the formation of chevrons, which has attracted increased attention (R. Stannarius, H.-J. Huh). EC in free standing smectic films works rather differently. Whereas 10 years ago, when this system was presented for the first time, the specific mechanism for space charge generation was not clear, it has now been clarified (S. Morris).

Conceptually (but not experimentally) simpler are some reorientation phenomena resulting from oscillatory shear flow. A new, Fredericks-like instability driven by Poiseuille flow in a homeotropically aligned cell was presented. In the same geometry and in the presence of an electric field above the bend Fredericks transition, elliptic Couette flow leads to a slow precession of the director with a rate which, according to theory, should be related to the flow alignment properties of the material. Experimental demonstration of this prediction remains a challenge. The study of non-equilibrium growth of smectic B