



Molecular Crystals and Liquid Crystals

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Preface

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Preface

The 25th International Liquid Crystals Conference (ILCC2014) was held on the beautiful and historic campus of Trinity College Dublin (TCD) from June 29 to July 4, 2014. TCD is the single constituent College of the University of Dublin founded in 1592 by Queen Elizabeth I with a similar structure to that of the Colleges in Oxford and Cambridge. The conference was attended by more than 600 participants from 42 countries. The conference was formally opened on Monday, June 30, 2014, by Dr. P. J. Prendergast, Provost and the President of the University of Dublin. The opening ceremony was also attended by Professors J. B. Foley, W. J. Dowling (both from School of Engineering) and Professor J. G. Lunney (Head of School of Physics).

The conference program consisted of six plenary lectures. The first plenary talk was given on Monday, June 30, 2014, by Professor Noel A. Clark (University of Colorado, Boulder, USA) entitled “Appreciating the beauty and mystery of liquid crystals - Exotic phases and phenomena.” Professor Clark concluded his talk by presenting many evidences from his works that beauty and mystery of LCs as in the past are very much alive today and further research will unravel even more mysteries as well as lead to many more applications. The second plenary on Tuesday morning was given by Dr. Matthias Bremer of Merck KGAA, Darmstadt, Germany, entitled “Quantum chemistry in the design of liquid crystals for display applications.” He discussed the design of various possible steps during the synthesis of fluorinated compounds used in the modern display industry and illustrated how the computer simulation has increased the efficiency of realization of the final products. On Wednesday morning Professor John W. Goodby (York University, UK) delivered the third plenary talk on “Biomedical and biological applications of liquid crystals.” He reminded the audience that LCs are an integral part of our biological systems and how the understanding of liquid crystalline behavior advances our knowledge and helps us in solving intricate problems in medical science as well as advance their applications in future medical devices and artificial limbs. The fourth plenary talk was given by Professor Satyen Kumar (Kent State University, Ohio, USA) also on Wednesday morning, entitled “Solving the puzzle of de Vries smectics.” Such a smectic was first reported by Adrian de Vries (Kent State University) in non-chiral systems with almost no layer shrinkage observed at the SmA to SmC transition. This concept when applied to chiral systems will lead to ferroelectric display devices with optical clarity and with absence of zig-zag defects. These defects are one of the two major detrimental factors that mitigate against the use of smectics in displays. A number of models have been proposed to explain the unusually small layer shrinkage at the SmA-SmC transition as well within the SmC phase. In one of the prototype de Vries systems, Professor Kumar through his innovative X-ray experiments proved the validity of the diffused-cone molecular distribution over other existing models for the de Vries smectics. The key is still to find materials that will be useful in displays and satisfy other desirable characteristics. Professor Carsten Tschierske (Martin-Luther University, Halle, Germany) gave the Thursday morning interesting plenary talk on “Structural complexity and symmetry breaking in liquid crystals.” He presented recent ground-breaking work on new zeolite-like liquid crystalline honeycomb structures and on spontaneous emergence of chirality in cubic phases and isotropic liquids of non-chiral systems. The importance of

this kind of symmetry breaking for the emergence of uniform chirality in prebiotic liquids was discussed. The sixth plenary talk was given by Takashi Kato (University of Tokyo, Japan) on “Nanostructured functional liquid crystals for energy and environment.” This is a topic that continues to be of great relevance to the modern requirements for the clean environment, energy and global issues that confront the entire mankind. Professor Kato explained how the design of new LCs based on pi-conjugated molecules will be useful for sensing and energy applications.

In addition, there were 37 invited talks. The invited speakers came from the various countries given in parenthesis, with wide-ranging areas covered such as LC phases, structure and ordering, theory, simulation and modeling, columnar LCs for energy, environment and optics, chirality, polar order and bent-core LCs in biology, twist bend nematic phase, LCs in chromonics and photonics, LCs for display applications, nanostructures and blue phases, biaxial nematic phase, subphases in AFLCs, LC nanocomposites, liquid crystalline alignment and confined systems and complex liquid crystalline systems other than polymers. The speakers were G. Ungar (UK), A. Fukuda (Japan), Quan Li (USA), A. Kocot (Poland), A. Vanakaras (Greece), C.-C. Huang (USA), Y. Takanishi (Japan), C. Rosenblatt (USA), H. Yokoyama (USA), P. Collings (USA), L. Hirst (USA), H. Yoshida (USA), S. Zumer (Slovenia), H. Takezoe (Japan), K. A. Suresh (India), R. Limieux (Canada), V. Chigrinov (Hong-Kong), G. H. Mehl (UK), H. Brand (Germany), J. Ball (UK), M. Osipov (UK), O. Lavrentovich (USA), G. R. Luckhurst (UK), Sin-Do Lee (Korea), D. Walba (USA), M. Wilson (UK), I. Dozov (France), T. Wilkinson (UK), I. Musevic (Slovenia), A. Boborovsky (Russia), I. Smalukh (USA), C. Zannoni (Italy), H. Kitzerow (Germany), G. Scalia (Korea), U. Raviv (Israel), A. Griffen (USA), and P. Dolganov (Russia). In addition there were 250 oral and 360 poster presentations.

There were talks from the seven 2014 ILCC prize winners: J. Selinger, Gi-Dong Lee and Michi Nakata for early career achievements and four young researchers who won the Glenn H. Brown thesis awards. A day before the conference, a tutorial session was arranged especially for young researchers. Each of the five tutorials was given by D. Dunmur (Manchester, UK), Helen Gleeson (Manchester, UK), David Allender (Kent State, USA), Jang-Kun Song (SKKU, Korea), and Ewa Gorecka (Warsaw, Poland). Sixty participants attended this tutorial session on Sunday, June 29, 2014. There were 240 oral presentations on the various contemporary topics in the subject. In addition, there were 360 poster presentations which spanned the entire area of research interests of the liquid crystal community. Two poster prizes were awarded in each of the areas of chemistry, applications, LCs in biology and physics of liquid crystals.

During the conference Professor John W. Goodby paid a rich tribute to Professor George William Gray CBE, FRS, Hon MRIA, Kyoto prize Laureate for Technology of LCDs. Professor Goodby highlighted many outstanding achievements of Professor Gray including his famous 1973 paper on the synthesis of room temperature LCs: cyanobiphenyls (including 5CB). This work led to the multi-billion dollar LC display industries that have aided in revolutionizing the information technology for the last three decades. Almost every human being on this planet continues to benefit from Professor Gray discoveries: see the ubiquitous use of mobile phones, wrist watches and calculators even in far-off underdeveloped countries in the world. In addition to being an excellent innovator, Professor Gray encouraged others and especially young researchers to carry on with the research work in LCs. Professor Gray visited Dublin on at least three occasions and visited the Liquid Crystal laboratory in TCD on two occasions and talked to the Researchers. His last visit was to open the 9th International Ferroelectric Liquid Crystal Conference (FLC2003) which

was also held in Trinity College Dublin in August 2003 and he gave an after-dinner speech with great fun and humor.

The proceedings of ILCC2014 have been published in Volumes 610–613 of *Molecular Crystals and Liquid Crystals*. These are divided into Biology, Chemistry, Physics, and Applications. I thank Dr. Olga Panarina, the conference secretary, not only for her efficient performance of conference duties but also in assisting me in editing these proceedings. I thank the Science Foundation of Ireland for a grant to cover some of the activities of the conference including the funding of the poster prizes and Failte Ireland for the bid related and marketing costs.

Professor J. K. Vij

Conference Chair 2014

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