24th National Conference on Liquid Crystals (NCLC) at IISER Mohali, India

The National Conference on Liquid Crystals (NCLC), India is an event held every year in different parts of the country. The 24th NCLC was organised by the Indian Institute of Science Education and Research (IISER) Mohali, Punjab (Figure 1) in association with the Indian Liquid Crystal Society (ILCS) during 11–13 October 2017. Dr. Santanu Kumar Pal, Department of Chemical Sciences conducted the 3-day conference guided by the National Advisory Board and supported by an Organising Committee.

IISER is an autonomous academic institute established by the Government of India in 2007 to promote research in frontier areas of science and to provide basic science education at undergraduate and post-graduate level. It has a large campus of about 150 acres with student strength of about 2000. Mohali city is a commercial hub lying adjacent to the city of Chandigarh and also a part of the Chandigarh Tricity.

The scientific programme commenced with a Keynote Address by Prof. N. Jayaraman (Indian Institute of Science [IISc] Bangalore) titled ‘Dendritic liquid crystals and dendritic monomer-polymer assemblies’ (Figure 3). He discussed the salient aspects of the dendronised monomer-polymer vesicles in biomolecular interactions. He showed that the dendritic organisation of monomers that undergo photopolymerisation in aqueous solutions provide a new route to prepare robust one-dimensional polymers. The first invited talk was given by Prof. Corrie T. Imrie (University of Aberdeen, UK) on the twist-bend nematic phase (Figure 4). He reviewed the recent literature and presented a range of new LC dimers and other types of materials. He talked about the structure-property relationships and potential applications of the twist-bend nematic phase. Prof. Shri Singh (Banaras Hindu University, Varanasi) in his talk described the phase transitions in chiral ferroelectric LCs. He explained a free-energy density expansion for the phase transition properties of chiral ferroelectric LCs. Prof. Kattera A. Suresh (Centre for Nano and Soft Matter Sciences [CeNS] Bangalore) gave a talk on phase and thickness behaviour of films of cholesterol and cholesteryl esters at interfaces. He showed that the packing of cholesterol and cholesteryl esters at interfaces are related to the Craven’s model of packing of molecules in the bulk. He also presented the switching of cholesteryl laurate from a fluidic bilayer phase to a crystalline bilayer phase. Prof. G. H. Mehl (University of Hull, UK) talked on understanding the structure and structural parameters of systems with two nematic phases. He discussed the results based on sets of materials and mixtures designed with the specific aim of understanding the structure-property correlations for the formation of low temperature nematic phase. Prof. Pratibha R (Raman Research Institute [RRI] Bangalore) described cellular structures in dynamically asymmetric liquid crystalline mixtures. She showed that dissimilar size and shape of rod-like and bent-core molecules.
manifests itself in the formation of cellular structures at phase separation. The participants showed keen interest in all the lecture sessions. (Figure 6).

The poster presentations were held in the evening at the Lecture Hall Complex Foyer. The venue provided a congenial and friendly atmosphere for interdisciplinary discussions. The content of the posters included research in soft matter, molecular design and engineering of new materials, photonics biological applications of LCs and so on. It was an informal gathering of the researchers, seniors, juniors, freshers and curious visitors from other departments.

The second day’s technical session began with the 6th invited talk by Prof. Sandeep Kumar (RRI Bangalore) on the search of new discotic liquid crystals (DLC) (Figure 5). He talked about the structure-property relationship of DLC emphasising on the technological applications. In this direction, he described recent efforts in the design and synthesis of some new discotics by his group. It was followed by Prof. Jon A. Preece (University of Birmingham, UK) with a talk on carbazole based LCs. He extensively discussed the chemistry involved to produce a vast array of these homologue materials and to further examine their LC and physical properties. Prof. Ravindra Dhar (University of Allahabad, Allahabad) delivered a talk on the enhanced efficiency of photo voltaic cells through columnar phases of discotic LC materials. Dr. S. Krishna Prasad (CeNS,
Bangalore) talked on the photonic band gap, photoluminescence and fast switching of emission. He described the dual-frequency addressing scheme switching between two anisotropic values yielding high contrast ratio. The succeeding talks discussed topics ranging from birefringence in re-entrant nematic LC mixtures, synthesis of materials with naphthalene ring and their metallomesogens, photo-driven change in the polar environment tunes gelation in a nematic LC, influence of chirality on the properties of columnar mesophase of homomeric dipeptides, DFT calculations of 2D nematic colloids and so on.

The third day technical sessions commenced with the fifteenth invited talk by Prof. Jagdish K. Vij (Trinity

![Figure 3. Keynote address by Prof. N. Jayaraman on dendritic liquid crystals.](image)

![Figure 4. Prof. Corrie T. Imrie delivered a talk on the twist-bend nematic phase.](image)

![Figure 5. Prof. Sandeep Kumar in the Invited talk discussed various approaches and challenges to discover new DLC materials for device application.](image)
College, Dublin, Ireland) on ferroelectric LCs with large electro-clinic effect in SmA* phase and unusual low-layer shrinkage in SmC* phase (Figure 8). He showed that the oriental distribution function in SmA* phase follows diffuse cone model especially close to the SmA* to SmC* phase transition temperature. The next talk was on the morphological and interfacial features of twist-bend nematic drops by Prof. K. S. Krishnamurthy (CeNS, Bangalore). Dr. C. V. Yelamaggad (CeNS, Bangalore) delivered a talk on self-assembly of liquid crystal-gold nanoparticle conjugates into helical lamellar superstructures. In the next technical session, Dr. Rajiv Manohar (University of Lucknow, Lucknow) presented Graphene and its oxide induced changes in characteristics of ferroelectric LCs. An interesting talk was given by Dr. Abhishek Chaudhuri (IISER Mohali) on living LCs. Dr. Ravi K. Shukla (DIT University, Dehradun) discussed about metal salts dispersed lyotropic liquid crystalline phases and gels for electrolytes applications. He highlighted the effect of transition metal salts dispersion on the mesomorphism of the nonaqueous lyotropic phases and their conductivity.
In the last technical session of the conference Dr. Maddasani Srinivasulu (Manipal Institute of Technology, Manipal) talked about the synthesis and characterisation of new Schiff’s base LCs with various terminal groups and study of the effects of terminal groups on the mesomorphic properties and Dr. Manoj Bhushan Pandey (VSSD College, Kanpur) extensively discussed the properties of elastic multipoles created in nematic colloids by high and low symmetric colloidal particles with complex geometrical shape of spirals.

The day was rounded off with a Valedictory Function which included prize distribution of ‘Dewan Jawahar Lal Nayar Memorial Prize’ for the best poster award, feedback for the conference as well as a felicitation to Prof. Kattera A. Suresh, President, Indian Liquid Crystal Society. As a custom of the annual National Conference
on Liquid Crystals (NCLC), four best poster prize awards were given: two in chemistry and two in physics. In
chemistry, Orodepo Gabriel Ogunsola (IISc Bangalore) (Figure 9), Ravindra Kumar Gupta (Indian Institute of
Technology, Guwahati) and in physics, Pawan Singh (Baba Saheb Bhimrao Ambedkar University, Lucknow),
Ramasamy Jayaparakasam (Bannari Amman Institute of Technology, Tamil Nadu) were awarded cash prize and
a memento.

The conference came to an end with an emotional fare-
well felicitation to Prof. Kattera A. Suresh on the completion
of his two terms as President of the Indian Liquid Crystal
Society for the last 10 years (Figure 10). Many of his admirers
and friends spoke affectionately about his contribution in
conducting the NCLC in various parts of the country,
encouragement and support to the Indian liquid crystal
community. Prof. Ravindra Dhar spoke about his many
scientific contributions including the discovery of DLCs.
Prof. Sandeep Kumar and Dr. S. Krishna Prasad shared
their personal experiences which they had with Prof.
Suresh over many decades. Prof. Banani Das and Dr.
Bharat Kumar talked about some interesting experiences
with Prof. Suresh on their project and research collabora-
tion. Prof. N. Jayaraman and Dr. Santanu Kumar Pal sum-
marrised his friendly nature, his impact and help in the
science funding to LC community in India and so on.

A positive feedback given by the delegates for the con-
ferece was very encouraging. The diverse topics covered
in the scientific programme and the excellent facilities provided in the IISER campus, accommodation, and kind hospitality were highly appreciated. A special appreciation was made on the all-round assistance provided by the cheerful, ever smiling volunteers. On the last day, a group photograph of all the NCLC participants was captured in front of the Lecture Hall Complex (Figure 11).

The private sponsors like Anton Paar, Edwards, IKA, Borosil, Sinsil International, Xenocs and TCI chemicals put up exhibition stalls for 3 days with an interactive approach with the delegates.

In addition to scientific activities there were some events arranged for the delegates.

A conference dinner was organised at the Banquet Hall, Hotel Hometel, Chandigarh on the evening of second day. In addition to the delegates, the faculty of IISER and their families joined for the dinner (Figure 7). This gave an opportunity for the delegates to interact with the locals and learn more about the Mohali-Chandigarh culture. It was a joyous and informal get-together with discussions not only on science but also on society, culture, sports and so on amongst all young and senior guests.

On the final day evening, a sight-seeing trip to Sukhna Lake, Chandigarh was organised for all the participants. Sukhna Lake is a reservoir at the foothills of the Himalayas and a perfect sight for nature lovers. The scenic beauty of the lake with the far off Himalayan mountains in the background provided an ideal tranquil spot for the delegates after the hectic conference. It spontaneously led the delegates to take selfies to preserve the memorable evening.

In a nutshell, the 3-day long programme covered a variety of research topics in soft matter science. The presentations were informative and stimulated networking with other researchers from India as well as abroad owing to much fruitful collaborations. The undergraduates, BS-MS students and new research scholars got a chance to get familiar with the research work and to build strong concepts. All the sessions were jam packed which showed sheer interest by the participants as well as the gravity the sessions had.

I feel privileged to organise this conference and would like to thank the Indian Liquid Crystal Society for giving me this opportunity. I would also like to thank IISER Mohali for granting the permission to host the conference at the institute. The generous support from the Government funding agencies such as Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Indian National Science Academy (INSA), Council of Scientific and Industrial Research (CSIR), Defence Research Development Organisation (DRDO) as well as the private agencies made it possible to organise such a grand event. Last but not the least, I would like to appreciate the commendable efforts put in by all the enthusiastic volunteers of the organising team to make this event a huge success.

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