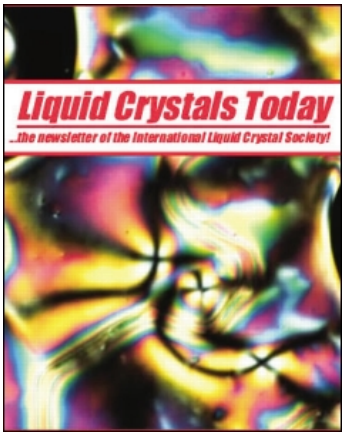

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1977 Society for Information Display (SID) Symposium

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polymeric siloxanes (P. Styring, Hull). Furthermore, the induction of mesophases by doping palladium complexes with acceptor molecules (M. B. Ros, Zaragoza) has been presented.

Chiral β-diketone complexes are described as the first switchable metallomesogens with columnar phases (T. Sierra, Zaragoza), whereas with chiral dopants in achiral metallomesogens the ferroelectric S_C^* phase has been induced (M. A. Athanassopoulou, Darmstadt).

Research on metallomesogens is leaving the initial stage of synthesis and characterization. This was once more demonstrated by the investigations on magnetic properties (I. Ovchinnikov, Kazan; M. Bose, Calcutta), but also by redox and conductivity measurements of metallomesogen-doped nematic solutions in order to clarify conduction mechanisms in metallomesogens (F. Lelj, Potenza). In connection with this, eutectic metallomesogen mixtures as materials for electro-optical application have been described (H. Hakemi, Milano).

Last but not least we report on the overview on lyotropic metallomesogens, given by D. Bruce, Exeter, who emphasized the increasing interest in this recent field of research, additionally underlined by reports from his own group on the lyotropic behaviour of phthalocyanine complexes (H. Eichhorn, Exeter) and chiral ruthenium surfactants (H. Jervis, Exeter).

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1977 Society for Information Display (SID) Symposium

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The 28th International *Society for Information Display* (SID) Symposium and Exhibition was held at the Hynes Convention Center in Boston on 11–16 May 1997. Boston is one of America's most agreeable cities providing participants with a rich variety of history, architecture, and entertainment. The annual SID event is the leading international forum for advances in electronic display applications and products, technology, manufacturing, testing, and human factors. This year's assembly was most significant because it celebrated two of the display industry's most significant accomplishments; the 100th anniversary of the modern cathode-ray tube (CRT) and the 25th anniversary of the active matrix liquid crystal display (AMLCD). The CRT was first invented at the University of Strasbourg by Karl Ferdinand Braun in 1896–97, and Peter Brody and a team at Westinghouse in Pittsburgh, Pennsylvania fabricated the first operational AMLCD in 1972. Keynote addresses were presented by Peter Brody and Shinji Morazumi on AMLCDs, and Peter Keller on CRTs to celebrate the significance of these two major inventions which can confidently be said to have revolutionized the world.

According to many articles in the technical literature and trade magazines, one may be led to believe that LCDs will be replaced in the future by field emitting displays (FEDs), organic light emitting diodes (OLEDs), etc., but I can safely say that competing technologies have a long way to go. Just spend a few days at the annual SID show and one immediately concludes that nothing could be further from the truth. This year's SID was dominated by compelling advances in LCD technologies on both the product and research fronts. As competing technologies continue to work toward the performance benchmark of the AMLCD, liquid crystal technologies are continually evolving, prices on AMLCDs continue to drop, and new liquid crystal configurations with unique product potential are on the horizon. The 'Achilles Tendons' of LCDs, such as the viewing angle, operational temperature range, and power (required backlight), have been solved and implemented into many display products. As competing technologies struggle to keep up with the rapid pace of LCDs, liquid crystal scientists and engineers continue to advance their technologies and find new product applications for LCDs.

One the materials side, there was a lot of emphasis on reflective liquid crystal displays and liquid crystal configurations with bistable memory. These sessions were very exciting and well attended. Hook and co-workers are looking at novel addressing schemes to drive STNs to capitalize on their bistable hysteresis loop, Bryan-Brown and co-workers presented a unique grating aligned bistable nematic device which I am sure we will hear more about in the future, and Martinot-Lagarde reported on a fast switching monostable surface anchoring configuration. Truly reflective displays with bistable memory caught the eyes of many participants. Increasing the dynamic response time of cholesteric displays was reported by Zhu and Yang, and Ma and Yang presented a means for achieving a white reflecting polymer stabilized cholesteric display. Bunz and co-workers presented work on sputtered alignment layers to increase the contrast ratio of cholesteric liquid crystal displays. Buerkle and co-workers reported on a very new application for bistable liquid crystal materials — smart cards — small (credit card size), low resolution displays which can be fabricated onto a plastic card and placed in your wallet or purse. Faster response time, white reflecting displays, and higher contrast for cholesteric bistable displays has been on the minds of researchers and technologies for years, and now promising solutions to these issues are now being disclosed.

Colour displays have become a part of our everyday life — from television to computer monitors to automobile dashboards and even aircraft cockpit instrument panels. The ubiquitous colour CRT and AMLCD has introduced modern colour into most display applications. Colour is a pervasive feature of our everyday environments and therefore it is

not surprising that for most visual tasks, monochrome images tend to be unsatisfying. Reflective colour LCDs is something of a holy grail at the moment because display users and integrators are demanding colour, and LCD researchers have stimulated the relentless quest for colour in reflective displays. This year's SID unveiled some incredible prototypes of reflective colour displays. Sugiura and Uchida have a new backplane reflector for phase-change guest–host (PCGH) mode displays, and Ikeno and co-workers from NEC revealed a reflective guest–host mode display with 4096 colours. Okada and co-workers from Minolta reported on a three stack, red, green, and blue, cholesteric display, and Sonehara and co-workers from Seiko-Epson reported on a ¼ VGA reflective colour display using the inverted scattering mode of polymer dispersion materials. Kuo and co-workers from ERSO/ITRI and Wu from Hughes demonstrated a 10.4 inch mixed-mode twisted-nematic effect with full colour capabilities, and Nakai and co-workers from Toshiba reported on a tri-layer guest–host colour AMLCD. The market has certainly been waiting for reflective (low power), full-colour devices, and after this year's SID, I believe they are ready for many product applications.

As you walk around the Exhibition Hall at SID, you see many new liquid crystal display products that have implemented some sort of scheme to correct the viewing angle; however this has not stopped researchers from improving the viewing angle even more. Crossland and co-workers presented a photoluminescent LCD where the LCD modulates a phosphor screen. Yoshida and co-workers presented a wide viewing angle antiferroelectric liquid crystal display with a very fast response, and Ohmuro and co-workers reported on the positive viewing angle attributes of the vertical alignment mode. Wakemoteo and co-workers demonstrated an advanced in-plane switching mode. Nam and co-workers, and Chen and co-workers presented their work on improving multidomain mode alignment. A very exciting solution to the viewing angle issue is to simply laminate a retardation film onto an ordinary twisted nematic mode display — a simple solution; however, in the past, retardation films could alleviate some of the problems but not eliminate them all. Mori and co-workers presented novel compensation films for AMLCDs, fabricated out of discotic compounds, that may have far reaching implications for wide viewing angle TN displays in the future. Alignment layers were also addressed with Iimura and Kobayashi discussing the prospects for photo-alignment, Grueneberg and co-workers also reporting on non-rubbed photo-alignment layers, and Chien and co-workers reporting on new polyimides ideal for use on plastic substrates.

From the technology perspective, there were many presentations on bigger and better AM LCD technology. Low temperature polysilicon is attracting a lot of attention at the moment because it is required for the economical implementation of polysilicon's benefits; among these are the promise of low price AMLCD monitors. Higher resolution AMLCDs have been reported by dpiX, a new Xerox Enterprise Company, high aperture ratio AMLCDs reported by Mitsubishi, and high performance in-plane switching modes also disclosed by Mitsubishi. Microdisplays are also gaining momentum as active matrix processing techniques become more reliable. National Semiconductor reported on a miniature reflective active matrix polymer dispersed liquid crystal light valve, and Schuck and co-workers presented a head-up display for automotive applications to project a virtual image in front of the car. There is still a lot of work taking place on conduction effects and image sticking problems in LCD which were reported on by Colpaert and co-workers, Naemura and co-workers, and Lien and co-workers. Hermanns and co-workers reported on liquid crystal on silicon techniques. In addition there were sessions on manufacturing LCDs, passive optical elements, colour filters, polarizers, and human factors issues.

The poster sessions were also very exciting and informative. There were such a rich variety of posters on LC displays and related components that it would be impossible to name them all here in this review. To mention a few, Sharp Corp. showed off their 40 inch AMLCD, Faris and co-workers from Reveo demonstrated full-colour stereoscopic printing from cholesteric pigments, and Watson and co-workers presented new ideas on zig-zag defects in ferroelectrics. Short papers on the above mentioned research and much more can be found in the SID Conference Proceedings, *Digest of Technical Papers* **XXVIII** (1997). I strongly encourage liquid crystal researchers to attend the annual SID Conference. It will be held in Anaheim, CA in 1998. This annual event is the premier gathering of scientists, technologists, engineers, manufacturers and users of electronic displays. The SID symposia are a unique and important forum for everyone working in or requiring knowledge of the field of information display and provide many new opportunities for multi-disciplinary interactions. See you in Anaheim in 1998!