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SOCIETY FOR INFORMATION DISPLAY

SID-ME Chapter Spring 2004 meeting and SID-MEC General Meeting "OLED display technology and applications" March 25-26, 2004

at Covion, Hoechst Industrial Park, Frankfurt, Germany

The SID-ME Chapter Spring 2004 meeting on "OLED display technology and applications" was organized at the Covion site situated in the Hoechst Industrial Park Frankfurt/Main-Germany. The Hoechst Industrial Park is a center for innovation in chemicals where some 70 companies employ about 25 thousand people. One of these is Covion an "OLED shooting star" for the future. H. Schenk (Managing Director of Covion and conference chair) and J. Kimmel (European director of SID and program chair) opened the meeting. The conference comprised 21 oral presentations, the SID-MEC general meeting, a Covion tour and last but certainly not least a conference dinner at the ship "Goethe" cruising the Main river. More than 90 people attended the meeting, and it was noted that the consistently high number of participants, on this and previous SID-ME chapter meetings, indicates a general approval of the program quality and the networking opportunity.

Session 1, March 25, afternoon New developments in OLED's

H. Becker (Covion Organic Semiconductors GmbH, Frankfurt) talked about new material approaches for OLED and PLED displays. In both solvent based and sublimation based materials significant improvements were reported. For red and green good efficiency and promising lifetime is reached. For blue more work is needed.

I. Underwood (MicroEmissive Displays Ltd., UK) discussed the realization of light emitting polymer micro displays. The smallest lowest-power color displays in the world? A very nice demo was shown to illustrate the point.

J. Blochwitz-Nimoth (Novaled GmbH, Dresden) presented results on highly efficient OLEDs for full color active matrix displays. Using newly developed doped contact layers an efficiency improvement and a lowering of the operation voltages are

achieved. Also, integration in an a-Si active matrix back plane allows efficient top-emission.

A. Giraldo (Philips Research, The Netherlands) presented research on an active matrix polymer OLED display with optical feedback. It was shown that the internal compensation of OLED device ageing via a photosensitive circuit element, TFT or diode, is a most attractive route to alleviate burn-in and discoloration in AMOLED displays.

Session 2, March 25, afternoon OLED technology and manufacturing

F. Pieralisi (University of Stuttgart, Germany) gave a talk on active matrix OLED back plane circuit technology. The required control of short range and long-range uniformity in low temperature poly-silicon (LTPS) TFT's and the need for compensation using a current mirror circuit was elucidated.

M. Ueltzen (Fraunhofer Alliance Polymer Surfaces, Germany) presented an overview of the activities of the Fraunhofer Alliance Polymer Surfaces (POLO) in ultra-barrier films. This alliance comprises institutes at six locations and covering seven fields of competence that generates a coherent effort to establish and industrialize ultra-barrier films for display applications.

A. Gurke (Applied Films GmbH & Co. KG, Germany) discussed the development of a vertical inline vacuum deposition system for OLED production. A cycle time of 60 seconds and thickness uniformity of less than 5% is realized for substrates with a maximum size of 400 x 640 mm².

H. Kopola (Technical Research Center of Finland) talked about roll-to-roll fabrication technologies for OLED devices. Objective is to fabricate simple OLED displays in a cost-effective manner. Although there are many challenges it was shown that traditional roll-to-roll printing techniques may be used successfully in the fabrication of OLED layers and structures.

D. Buchhauser (Siemens AG & Osram Opto Semiconductor, Germany) discussed tailored color filtering of a white broadband emitter, as a possible route to full color displays. Using known spectral emission and degradation characteristics an optimum system combination for emitter, design and color filter can be calculated.

Session 3 March 25, afternoon Large-area OLED's

T. Beierlein (IBM Research, Switzerland) presented a talk on advanced OLED technology: the enabler for the world's largest (20-inch) full-color a-Si active matrix OLED display. A cooperative effort of IBM, CMO, IDTech and Covion succeeded in optimizing a top-emission structure, material performance (both the OLED emitter and the a-Si semiconductor), and driving circuit, in such a way that an impressive 20-inch

demonstrator could be realized (shown on the SID'03 exhibition in Baltimore). IBM Zurich contributed the modeling. Sufficient lifetime was anticipated.

H. Schemmann (Thomson, France) discussed the issues with OLED for video displays. There was a clear contrast with the previous speaker. It was stated that the high luminance required for video displays involves a high drive current, which implies a lifetime decrease and large ohmic losses. Also burn-in occurs because the RGB-materials degrade with a different rate. Further improvements in emitter material, especially blue, manufacturing (solution or evaporation technology) and a-Si technology (circuit, material) are required.

Conference dinner

The meeting included a conference dinner at the ship 'Goethe'; see picture. The restaurant ship was reserved for the occasion and going for dinner felt like taking part in a European display endeavour. On steady course and with a stimulating view on nightly 'Mainhattan' the tasty buffet dinner was indeed enjoyed very much.



J. Kimmel (Director of SID-MEC) and K. Sarp (the new Chair of SID-MEC) are ready to board the ship 'Goethe' for the conference dinner.

Session 4, March 26, morning Keynote presentation

B. Young (Display Search Inc., USA) presented an extensive overview of OLED market status and development forecast embedded in an all display technology covering perspective. While the large flat TV market volume for LCD and PDP is growing strongly, the display component maker profits are governed by the supply/demand ratio. For PDP an undersupply exists. For OLED's the market volume is still limited, but a steady and consistent development is anticipated. Small molecule OLED is much larger than polymer OLED and about 2 years ahead in development. As yet there is a cautious industrial commitment.

Session 5, March 26, morning European networks and display education

E. Haskal (Philips Research, The Netherlands) was allowed a few minutes at the beginning of this session to sketch the outline of the "Flexible display" proposal recently granted in the 6th framework program of the European Commission.

E. Maiser (DFF, German Flat Panel Display Forum) discussed recent advances in creating a European FPD Federation- the ADRIA project. The ADRIA project stands for Advanced Display Research Integration Action and involves work packages on context mapping, road mapping, education etc. The aim is to create a "one-stop-shop" for FPD in Europe.

W. Mildner (PolyIC GmbH & Co. KG, Germany) talked about strengthening Europe's competence position by new education efforts. The founding of the MikroFORUM Academy, a Private Graduate School for High-technology with a Pilot Course "Display Masters" was discussed. A kick-off workshop is planned for end of June.

C. Williams (Logystyx UK Ltd., UK) presented a talk on display education and networking in the U.K. Emerging technologies exceed the capabilities and resource of any single company to research, develop and exploit by themselves. Collaboration between companies (and academic institutions) and networking and education fill the gaps in resources and staff training. In the U.K. FLEXYNET a new network for companies working in flexible displays & flexible electronics started this year. Collaboration with European and other activities is sought.

A. Dore (Le Club Visu, France) the last speaker in this session reviewed the training sessions given by the Club Visu in France. Several day seminars for basic education and specialist training are given yearly, where recognized specialists from the industry and the academia give the lectures.

SID-MEC General Meeting

J. Kimmel (Director SID-MEC) and *K. Skarp (nominated for chair)* headed the SID-MEC general meeting, where the activities of the chapter were reported.

The election of the officers of the SID-ME chapter for the coming period took place. The proposed candidates were elected unanimously. The new Chapter committee is now composed as follows: *Kent Skarp (Chair)*, *Gerrit Oversluizen (Vice-Chair)*, *Herbert de Smet (Secretary)*, *Jutta Rasp (Treasurer)*. The abdicating officers *Norbert Fruehauf (Chair)*, *Andre van Calster (Secretary)*, and *Frank Rochow (Treasurer)* are thanked for their contribution to the society.

The membership fluctuates somewhat in line with conference activity. With about 530 members at the end of February 2004 the SID-ME chapter remains the second largest chapter. The healthy financial situation of the Chapter was explained. Two members approved the administration. For 2004 a larger than

usual spending is envisaged, due to the 10th anniversary occasion. Also a SID-MEC Student Award of 1500 Euro was installed to further and acknowledge outstanding display work. More details on the award and the application procedure are given below.

Also the next meeting was announced. The fall'04 meeting is to be held on 11 and 12 of October in Stuttgart (see further information below).

Session 6, March 26, morning Display applicability issues

K. Bjorknas (Nokia Research Center, Finland) talked about OLED performance from a usability point of view. Options and requirements for indoor and outdoor display applications were discussed. OLED displays are especially suited for high value products with full color high-resolution video. Brightness control for dark environments is a must.

K. Blankenbach (University of Applied Sciences Pforzheim, Germany) presented visualization software for simulation of OLED ageing. Easy to use software was developed for visualization of OLED degradation effects, which could also be used for PDP and CRT. This can be used to adapt device and application.

Session 7, March 26, afternoon OLED applications

C. Winnewisser (C.S.E.M., Switzerland) gave a presentation on low cost patterning of polymer light-emitting logos by printing methods. The possibilities with screen-printing, ink-jet printing and mold printing were discussed.

S. Riehemann (Fraunhofer Institute for Applied Optics and Precision Engineering, Germany) talked about OLED based projection systems for optical metrology. An interesting application where OLED light sources are applied to probe object dimensions was discussed.

E. Nielsen (SeeReal Technologies GmbH, Germany) presented the last talk on opportunities for OLEDs in 3-D displays. Mostly 3-D technology options and applications in general were discussed. It is however clear that OLEDs being thin fine pitch enabling displays are well suited to take part in the increasingly 3-D display future.



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Covion tour

In conjunction with this SID-ME meeting there was an opportunity to visit the Covion facilities. Most of the participants joined in for a show around of Covion's activity, which was given with great enthusiasm. Covion can deliver OLED materials, both small molecules and polymers. Covion started research work in 1992. Nowadays about 75 people work in research, application and development, and about 35 people run the production on a hired-in basis. In research new monomer and polymer materials are synthesized. In the application department these are functionally tested in devices. Those passing initial tests are fabricated in larger quantity in development, and a final selection reaches the production stage. The up scaling involved is illustrated below.



The tour was appreciated very much by the participants both because of its technical content and its illustration of an innovative display industry initiative.

Closing remarks

The spring'04 SID MID-Europe meeting was a successful event organized in a European centre for innovation in chemicals. It was another contribution to an innovative spirit for enterprise in displays in Europe.

Gerrit Oversluizen



Illustrations of the up-scaling from development to production equipment for OLED materials

Coming Event: SID-ME SID Mid-Europe Chapter 10th Anniversary Meeting

11-12 Oct. 2004, at the University of Stuttgart

Special Topics:

**Organic and Inorganic Active Matrix, Multimedia
Displays, Flexible Displays and Process Technology for
Displays**

Visit the website for latest information:

<http://www.lfb.uni-stuttgart.de/sidme>

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SID payment.

The SID annual membership fee amounts US\$ 75. Please note that the membership is now a rolling membership, which means that it runs 12 months from the month in which the payment was made. For more information see the SID website www.sid.org.

We encourage our members to pay directly to SID-HQ in the USA, but if they want to pay to the ME-Chapter directly the annual fee should be EUR 90 **with all bank fees covered by the member !**

In case of direct payment to the SID-ME Chapter the payment in EURO should be done to

Account no.: 206 020 1104

at: Berliner Sparkasse, Berlin, Germany

Bank code: BLZ 100 500 00

Account name: Frank Rochow, SID-ME

Please indicated your name on the remittance papers.

The Newsletter.

If you want to place an article in the Newsletter, which is interesting for the European display society, please send it to: G. Oversluizen, fax: +31 40 274 4335, E-mail: gerrit.oversluizen@philips.com

