FlexTech Alliance
for Displays & Flexible, Printed Electronics

FlexTech Trends

News from the world of displays and flexible, printed electronics

Volume 8 – Q4 2010

FlexTech Trends

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3081 Zanker Road, San Jose, CA, 95134 US.A Phone 1.408.577-1300 info@flextech.org

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Note from the President

by *Michael Ciesinski*

Flexible, printed electronics impact a wide spectrum of existing products and enable new product families to flourish. Consequently, there are opportunities for new manufacturing technologies as well as the reclamation of legacy manufacturing equipment and a readily available workforce.

This quarter, FlexTech Alliance hosted several events where we:

- Explored the latest innovations towards integrating flexible and printed technologies into practical electronics manufacturing.

- Explained the many intricacies involved in manufacturing various types of touch displays available.

- Observed the results of a successful retooling project of a legacy film producing plant into one of the world's largest roll-to-roll photovoltaic manufacturers.

You can review highlights from these events on pages 4 - 10 of this newsletter.

Many challenges remain in commercialization. The transition from proof-of-concept demonstration, to prototype, to manufacturing pilot, to full-scale manufacturing is not trivial.

The mission of FlexTech Alliance is to advance the growth, profitability and success of our member companies and organizations by sharing practical experience and developing solutions from R&D to commercialization.

With that in mind, we have some exciting and informative events happening soon.

Save the date for November 9 -10, 2010 and join us for FlexTech's technology workshop focused on sensors. This workshop includes a facility tour of Applied Materials. For details see page 13 or visit www.flextech.org.

Don't miss our biggest event of 2011 –
FlexTech Alliance invites you to the 10th annual
Flexible Electronics and Displays
Conference and Exhibition
Date: February 7 – 10, 2011
Location: Arizona Grand Resort, Phoenix, AZ
Earlybird Registration Now Open
Sponsorship and exhibition opportunities are still available
Visit www.flexconference.com or see page 11 for details.

We look forward to seeing you there.

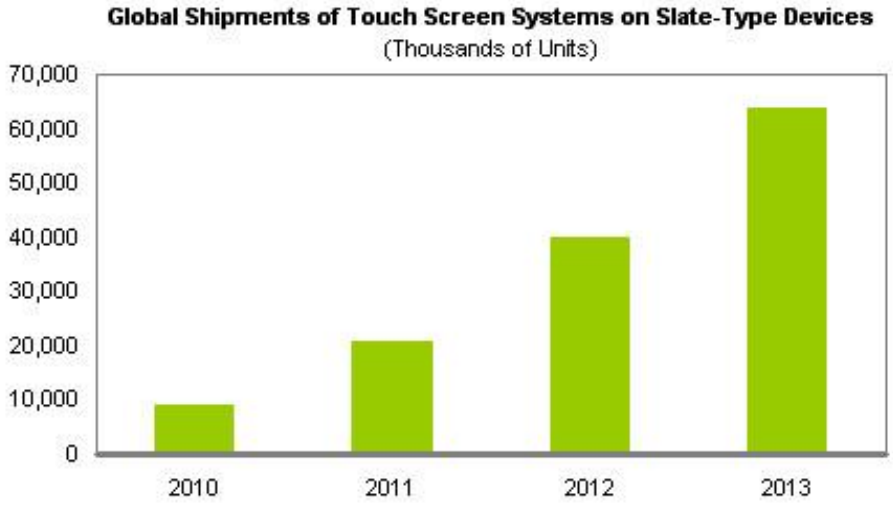
Market Update: Touch Technologies to Soar in the Coming Decade

by Thomas Morrow
Executive Vice President, Emerging Markets Group and Chief Marketing Officer, SEMI

Driven by sales of smart phones, tablet computers, e-books and other devices, touch technologies will rise by a factor of seven in the next three years creating new business opportunities for suppliers of vacuum deposition, screen printing, laminating, etch, sputtering, inspection, and other systems and equipment. With the success of Apple's iPad, the future of conventional keyboards is even being questioned and a wave of new touch systems are being developed that will revolutionize how people interact with technology.

iSupply estimates that shipments for touch screens for tablets, mobile phones and other products will rise 5000 percent in 2010 to 8.9 million units. Shipments of transparent touch screens will then increase to 63.9 million units by 2013. DisplaySearch reported that total touch screen module revenue will grow from $4.3 billion in 2009 to nearly $14 billion by 2016, a compound annual growth rate of 18%. Due to the popularity of the iPad, the market is currently experiencing capacity shortages and a wave of innovation and investment is expected to hit the industry.

Attendees of a short course on touch technologies, hosted by FlexTech Alliance at the recent SEMICON West event, learned about the key applications, trends, and technology drivers that are behind this technology wave.



Source: iSupply

Instructors Abbie Gregg from Abbie Gregg, Inc. and Geoff Walker from NextWindow presented technical and application overviews of all of the 13 transparent touch technologies that are used on top of displays, as well as an introduction to the newest "in cell" touch technologies. The technologies covered were analog & digital resistive, surface & projected capacitive, surface acoustic wave (SAW), traditional & waveguide infrared, optical, acoustic pulse recognition (APR), dispersive signal technology (DST), force sensing, in-cell, and vision-based.

Pre-iPad, most of the slate PCs on the market relied on either active digitizers or resistive screens for touch functionality. According to DisplaySearch in 2009 all forms of analog resistive technology reached over $2 billion and 452 million units, representing 48% of the revenues and 74% of total units. Projected capacitive screens used in the iPad, which only appeared in this market in 2007, had a very small share, but now are expected to outpace resistive technology.

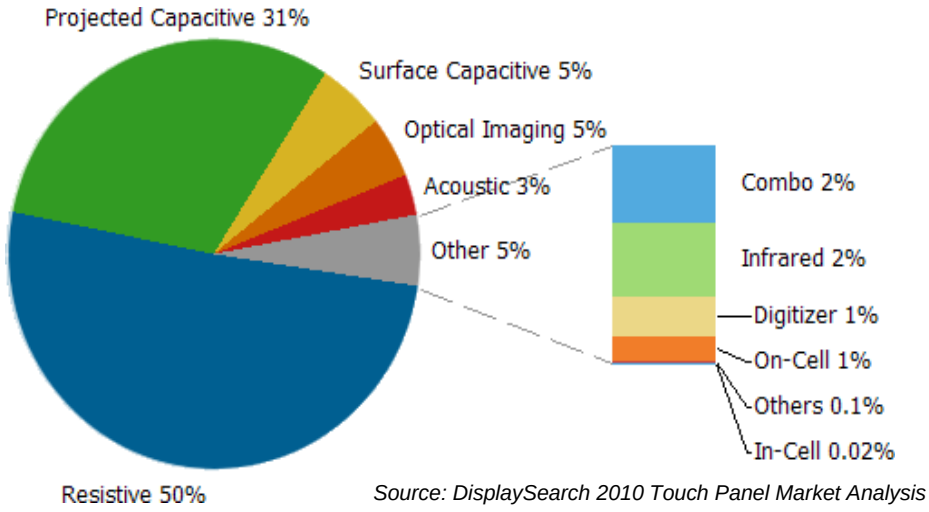
The touch screen industry is extremely dispersed with many companies pursuing either single or multiple touch technologies. Approximately 90 companies are manufacturing resistive technologies. According to Gregg and Walker, projected capacitive technology has an estimated 56 suppliers, which is nearly twice as many as last year's 27 suppliers.

The principal factor in the rapid shift to projected capacitive technology is multitouch technology. Multitouch refers to a touch system's ability to simultaneously detect and resolve a minimum of two or more simultaneous touch points. The human interactive experience is dramatically improved when multiple touches can be detected and fully resolved. Mainstream exposure to multi-touch technology occurred in 2007 when the iPhone gained popularity. Today, most operating systems support multitouch, including Mac OS X, Windows 7, Apple's iOS, Google's Android, Palm's webOS, Symbian OS, Microsoft's Windows Phone 7, and BlackBerry OS 6.0.

After the display, the next most expensive component on the iPad is the capacitive touch screen assembly, reportedly supplied by Taiwan's Wintek Corp for around $30. Other makers of such assemblies include Sintek Photronic Corp., TPK Solutions Inc., Touch International and Young Fast Optoelectronics Co. Ltd. News reports have Wintek currently expanding its production lines in the Chinese cities of Dongguan and Suzhou to catch up with the demand, adding 1.6 million touch screens to the monthly supply.

A capacitive touchscreen panel consists of an insulator such as glass, coated with a transparent conductor such as indium tin oxide (ITO). Human touch is a conductor that will distort a screen's electrostatic field, measurable as a change in capacitance. Different technologies may be used to determine the location of the touch. The location is then sent to the controller for processing. Projected capacitive touch technology is a capacitive technology which permits more accurate and flexible operation, by etching the conductive layer. An X-Y grid is formed either by etching a single layer to form a grid pattern of

Touch Screen Technology Market Share by Revenues 2009



Source: DisplaySearch 2010 Touch Panel Market Analysis

electrodes, or by etching two separate, perpendicular layers of conductive material with parallel lines or tracks to form the grid. The use of an X-Y grid permits a higher resolution than other technologies.

iSupply reports that three separate ICs are used to support the touch screen display which indicates that the design is in still in its infancy, and suggests that future integration into a single device is possible. Future versions of the iPad are likely to use a single-chip solution for supporting the touch screen functionality, creating opportunities for suppliers that can offer such products.

Capacitive sensing electrodes can be embedded in LCD display manufacturing either through in-cell or on-cell (out-cell approaches laminate the touch screen directly on top of the LCD screen). In-cell integration requires a change in the LCD fabrication method to embed the charge-sensing electrodes inside the LCD cell. Out-cell integration is an addition to the color filter process that places an array of indium tin oxide (ITO) or alternative transparent conductors on the top surface of the color filter substrate.

As Gregg and Walker observe, "there is no perfect touch technology."

Each of the 13 current touch technologies has unique usability, performance and integration characteristics. What is optimal for automotive, POS terminals or interactive signage may not be optimal for slate computers or mobile phones.

What most observers do agree on, however, is that this market is very early-stage. Today's manufacturing and supply solutions are almost assured of being upgraded, enhanced and overhauled over the next several years as the total market triples. The success for the iPad, as well as the many smart phones on the market, have demonstrated that touch technologies now rival—if not exceed—the functionality and user preference of keyboards. New systems are being developed with the user interface as the primary design consideration—not the mother- board.

Rivals to the iPad and new touch-enabled applications are sure to emerge in the coming years. For equipment and materials suppliers, opportunities for innovation and profit abound.

For more information:
FlexTech Alliance www.flextech.org
Abbie Gregg, Inc.
www.abbiegregg.com
NextWindow www.nextwindow.com

Summary of FlexTech's Extreme Electronics Session at SEMICON West 2010

It was standing room only at the FlexTech Alliance hosted event "***Flexible and Printed Electronics: Product and Supply Chain Innovation. What's now and what's next for the manufacturing of flexible displays, lighting and photovoltaic products?"***

This Extreme Electronics session at SEMICON West 2010 in San Francisco highlighted the progress being made integrating flexible and printed technologies into practical electronics manufacturing.

Innovations for making electronics on flexible substrates open up new form factors, price points and performance possibilities for wide-area electronics. Many of the practical solutions will require combining new approaches for flexible electronics with established semiconductor manufacturing steps and incorporating hybrid devices. At this Extreme Electronics session, companies who are driving these innovations updated the audience on advancements being made for the production of high performance, large area, flexible electronics across sectors. Here's a recap:

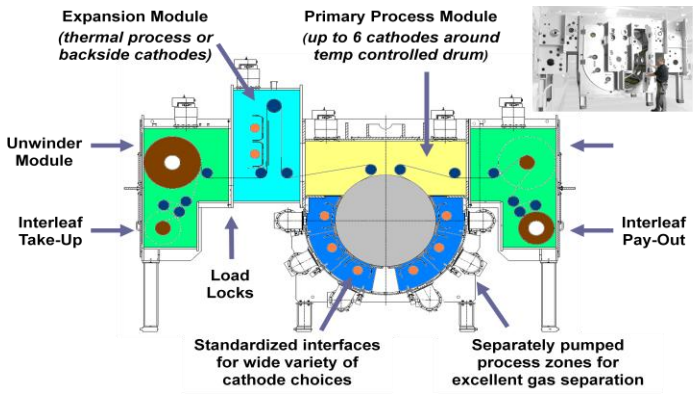
The Value of Printed Electronics in the Face of Low Cost Conventional Electronics
Raghu Das, CEO, IDTechEx surmised that printed electronics is creating new markets. He forecasts that the market will grow from $2B to over $55B in the next 10 years.

Many products will be hybrid, such as flexible displays connected to conventional electronics. Supplying discrete components will not drive the industry; products are needed. Form factor is one of the biggest drivers. The next substrates are flexible plastic, foils, and paper. Printed electronics involves new equipment, new materials and new know-how.

Roll-to-Roll Manufacture of Flexible Electronic Devices
Neil Morrison**,** team-leader PECVD R&D, Web Coating Products, Applied Materials, described the principal challenges inherent to R2R device manufacturing and recommended strategies to mitigate these challenges. He discussed choice of substrate, thermal budget, layer stack stress, patterning, defects, yield & inline process monitoring and control.

Neil presented a variety of different web handling and coating technologies and platforms that Applied Materials has developed to enable high volume R2R manufacture of thin film based flexible photo-voltaic, silicon based TFT active matrix backplanes and touch screen devices.

Courtesy of Applied Materials



Unique Features of Gas Phase Deposition Key Enabling Technology

Dr. Christof Sommerhalter of AIXTRON gave an overview of Organic Vapor Phase Deposition (OVPD®) , an innovative technology for the thin film deposition of small molecular organic materials. It utilizes the advantages of gas phase deposition, where the materials are transported to the substrate by an inert carrier gas.

AIXTRON combined its proprietary Close Coupled Showerhead® (CCS) with the OVPD® technology to accommodate mass production requirements. In collaboration with UDC, AIXTRON has developed and qualified OVPD production tools addressing the requirements of OLED manufacturing.

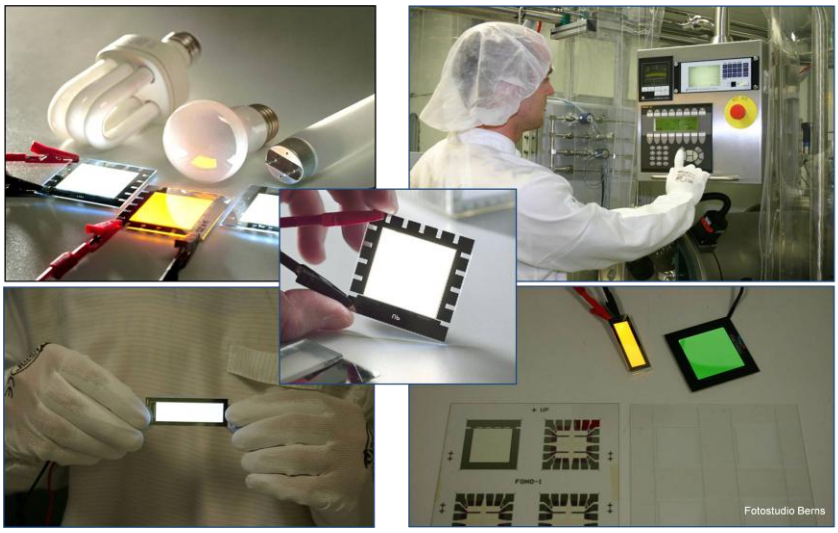
Challenges in Flexible Electronics Manufacturing

Doug Loy, Ph.D., Director of Technology, Flexible Display Center (FDC) at Arizona State University shared information on the temporary bonding technology the FDC has developed as a method to allow flexible substrates to be processed in standard toolsets with little or no modification.

Flexible substrates have received considerable interest as substrates for semiconductor, electronic, and display applications.

Thin film electronics on flexible substrates provide the potential for lightweight, rugged devices.

The FDC has established a 6" line and a Gen II line for processing of thin film electronics on flexible substrates which utilize its newly developed temporary bonding process.

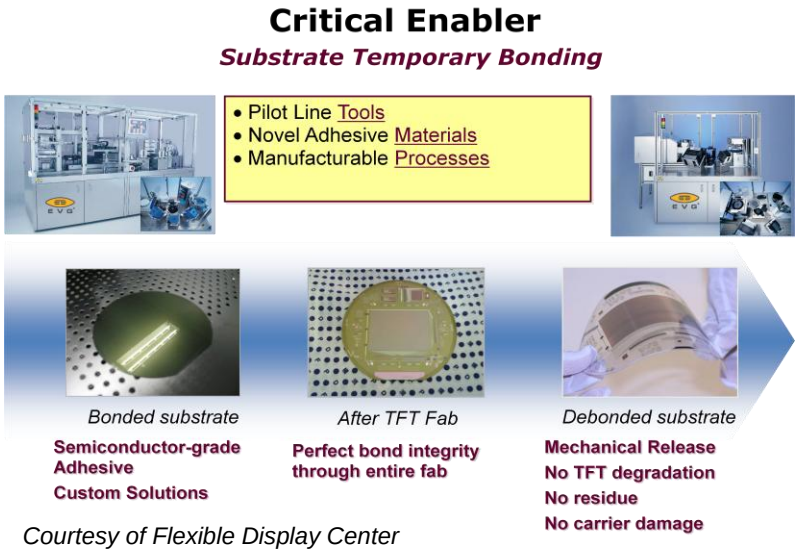


Courtesy of AIXTRON

Printed Flexible Electronics: Display and Sensor Applications

Ana Claudia Arias, Ph.D., Area Manager, Printed Electronic Devices Group, Palo Alto Research Center (PARC), discussed the challenges associated with the processing of semiconducting materials on flexible substrates. Examples were given of commercial applications where flexible electronics and displays are desired.

Recently, PARC has demonstrated devices targeting medical applications such as flexible hybrid image sensors and flexible blast dosimeter tapes to detect the occurrence of events that cause traumatic brain injury. The sensor tape design includes integrated sensors, signal conditioning electronics, non-volatile memory and a thin film battery.

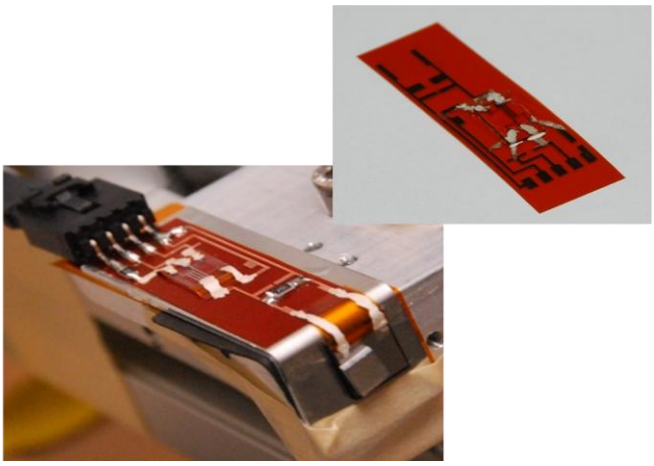


Courtesy of Flexible Display Center

The electronic circuits are based on jet-printed organic electronics with the emphasis on low-voltage electronics due to the limitations of the battery size.

In order to meet the low cost target of the tapes, fabrication techniques such as inkjet printing, laser machining and lamination are employed with all deposition and patterning steps being compatible with future roll-to-roll manufacturing.

The goal is to lower processing temperatures in order to use plastic substrates and introduce direct writing steps to reduce the use of materials and provide a lower cost approach to manufacturing.



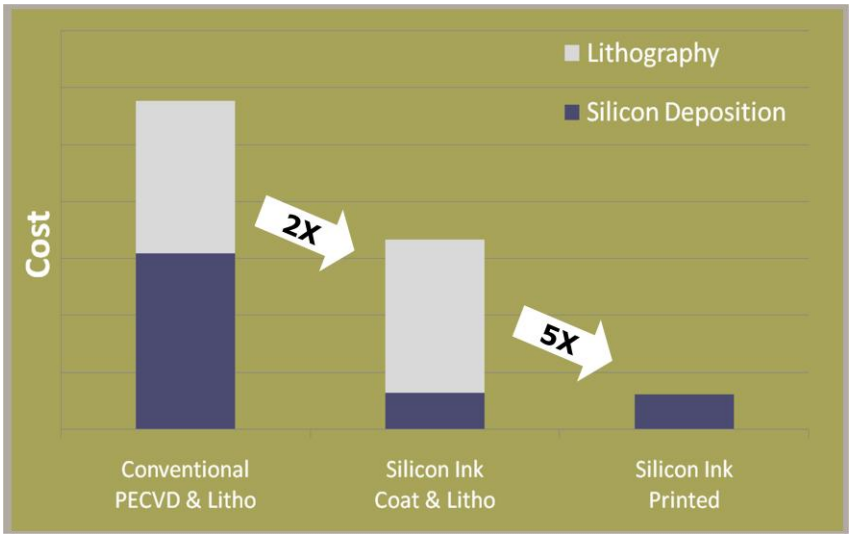
Prototype sensor with printed unipolar inverter
Courtesy of PARC

Printed Silicon - A New Paradigm for Low-Cost Electronics

Joerg Rockenberger, Ph.D. Director of Partnerships and Alliances, Kovio, highlighted key advances in printed silicon electronics and its application to item-level intelligence and a variety of industries.

Recent breakthroughs in printed silicon, such as printing of silicon and other inks, are enabling the development of high performance electronics on low-cost flexible substrates at a fraction of the cost of conventional technology.

As a result, flexible silicon electronics are now affordable for a variety of different applications such as RF barcodes and tags, display backplanes, solar applications, sensors and more.



Courtesy of Kovio

View video coverage of Extreme Electronics by MarketWatch
Click Here

Highlights from FlexTech's Quarterly Workshop on Flexible, Printed Electronics Konarka, New Bedford New Bedford, Massachusetts September 15 – 16, 2010

Larry Weldon, Vice President, Manufacturing, Konarka

More than most disruptive technologies, Thin Film PV (TFPV) manufacturing requires close cooperation among industry, academia, and government in order to meet the aggressive goals of the U.S. Department of Energy to advance energy independence. The emerging field of thin film organic photovoltaics, in particular, cannot easily adapt old designs of legacy production tools. The transition from proof-of-concept demonstration, to prototype, to manufacturing pilot, to full-scale manufacturing is not trivial.

With these challenges in mind, FlexTech Alliance recently held its fall quarterly workshop - "***Advanced Materials and Processes Enabling Thin Film PV R2R Manufacturing***". This workshop focused on technology transfer and scale-up of organic and inorganic materials and their processes from the lab to a manufacturing fabrication line. A wide range of manufacturing issues were discussed – process development, control, modeling, scale-up, metrology and defectivity, tooling and supply chain synergy.

The workshop was well attended with more than 65 people present, from local printing and PV industries and from as far away as Japan. Academia was well represented with participants from Massachusetts Institute of Technology (MIT), University of Massachusetts (UMass.), and Western Michigan University (WMU).

As a precursor to the workshop, attendees were able to experience, first hand, the world's largest roll-to-roll flexible thin film solar manufacturing facility during the tour of Konarka, New Bedford. This plant is a re-engineered, former Polaroid plant - now capable of producing in excess of 10 million square meters of PV material per year. The tour provided an understanding of the size, scope, and complexity involved in the integration of several PV manufacturing steps.

During the morning session of the workshop, presentation topics covered market opportunities, energy strategies, and manufacturing challenges.

Panel Discussion: "How do we facilitate the development of a strong PV manufacturing industry and supply chain in the U.S.?"

The afternoon session involved an interactive exchange between attendees and a panel of six experts consisting of Larry Weldon and Eitan Zeira of Konarka, Jim Watkins from U.Mass., Bindu Nair of the Natick Soldier Research Development and Engineering Center, Brian Anthony from MIT, and Bob Reuss, former DARPA program manager.

The discussion began with questions about how to best retool from a traditional printing facility to printing flexible electronics. The conversation then focused on developing metrology and defectivity tools that can enable in- line and real time functional testing of thin film photovoltaics.

Presentation topics

Solar State of the Market: ***Current Opportunities and Challenges*** A look at the key challenges across the value chain that today's thin film developers must overcome, as well as new opportunities they can serve moving forward.	Johanna Schmidtke, Sr. Analyst, LUX Research
Developing a Power and Energy Strategy ***For the Soldier and Small Combat Unit*** An examination of methods to provide improved alternative power generating capability using flexible photovoltaics (PV) for forward operating bases, off-grid training sites, individual soldier items, and Special Operation Forces applications.	Bindu R. Nair, Technical Assistant to the Director, Natick Soldier Research Development and Engineering Center
Manufacturable Approaches to Self Assembled Energy Generation and Storage Devices An in-depth analysis of the self assembly of block co-polymers (and hybrid materials) and why these structures are of interest for roll-to-roll assembly of devices for PV and energy.	Dr. James Watkins, Director NSF Center for Hierarchical Manufacturing, University of Massachusetts
Future Challenges for the Industry of Organic Photovoltaics An evaluation of printing challenges for different processes, substrates and inks, plus a review of common printing defects – their cause, effect and prevention.	Eitan Zeira, VP Printed Organic Photovoltaics, Konarka

Johanna Schmidtke, Sr. Analyst, LUX Research presents
"***Solar State of the Market: Current Opportunities and Challenges".***

Register Now!

FlexTech Alliance invites you to the 10th annual
Flexible Electronics and Displays Conference and Exhibition
Date: February 7 – 10, 2011
Location: Arizona Grand Resort, Phoenix, AZ
Earlybird Registration Now Open at www.flexconference.com

Join this field of international experts from industry, academia and R&D as we share the latest advances in flexible, printed electronics and displays. Organizations presenting at the conference include LG Display, Samsung, HP, E Ink, ASU, PARC and many others.

As part of its special 10th anniversary celebration, the Flex Conference is expanding. New for 2011:

- A larger venue – now located at the Arizona Grand Resort, Phoenix, Arizona
- Extended focus on global technical and business issues, developments impacting the flexible electronics field, and areas where displays are a key driver
- Highlights of industry progress over the last 10 years and a look forward to where the industry is headed in the next 10 years
- Inaugural scramble golf tournament
- "Gala on the Green" special industry awards dinner event

Conference sessions will focus on the emerging fields of flexible, printed, and organic electronics manufacturing, including solar and photovoltaic, solid-state lighting, RFID, sensors, touch, energy storage, medical devices, and flexible display applications and markets.

Agenda at a Glance	
Sunday, February 6	Golf Tournament, Networking and Prize Presentations
Monday, February 7	Short Courses
	Welcome Reception
Tuesday, February 8	Flexible Electronics and Displays Conference and Exhibition
	Exhibitor Reception
Wednesday, February 9	Flexible Electronics and Displays Conference and Exhibition
	Special Industry Awards Dinner Event
Thursday, February 10	Flexible Electronics and Displays Conference and Exhibition

Sponsorship & Exhibition

The conference attracts more than 400 attendees and over 200 companies, universities, R&D labs, and government agencies representing the many different segments of the flexible electronics and displays value and supply chains. Attendees span the roles of technical, marketing, product development, manufacturing, and business planning functions.

Sponsors and Exhibitors at the 2011 Flexible Electronics and Displays Conference and Exhibition assure their company is recognized as an authority in the industry. FlexTech Alliance, Brede, and the Arizona Grand Resort offer you a full range of services from shipping and storage to signage and booth set-up. Our goal is to ensure your exhibit is easy and affordable while delivering a significant return on your investment.

Premier Sponsor - $8,000

Three full admissions to the Technical Conference (a value of $4,050)
Admission to three short courses (a value of $1,125)
Premier logo placement on conference signage
Logo placement on premium conference items
10X8 booth package (includes 6' table + electrical service)
Placement of literature in conference bag or folio
Placement of full-page B/W ad in Conference Guide

Sponsor - $4,000

Two full admissions to the Technical Conference (a value of $2,700)
Logo placement on conference signage
Choice of name placement on a break or luncheon service
10X8 booth package (includes 6' table + electrical service)
Placement of literature in conference bag or folio
½ page company description in Conference Guide

Exhibitor - $2,800

One full admission to the Technical Conference (a value of $1,350)
10X8 booth package (includes 6' table + electrical service)
½ page company description in Conference Guide

New sponsorship opportunities available:

- 1st Annual Golf Event
- Poolside Welcome Reception
- Exhibitor Reception
- Industry Awards Dinner

For more information about sponsorship please contact Cheryl Serame-Turk at email:
cheryl.serame-turk@flextech.org
or call FlexTech Alliance at (408)-577-1300

FlexTech Alliance's Quarterly Flexible, Printed Electronics Workshop
Registration is now open at www.flextech.org

Focus: Sensors
Date: November 9-10, 2010
Location: FlexTech Alliance Headquarters – San Jose, CA
Facility Tour: Applied Materials AKT plant
Speakers: Applied Materials, Lockheed Martin, Polyera
Flexible Display Center, FlexTech Alliance

"What if Higher Performance is Needed to Make Printed Electronics a Viable Industry?"

As smart, networked sensors become widely used in smart buildings, civil infrastructures, aircraft and other military and commercial applications, circuitry such as logic, memory, and power management become essential performance requirements.

What are the next steps for the flexible electronics industry to deliver the required higher performance functionality? Can current technology meet the needs or will a hybrid of silicon-based electronics and printed electronics be needed? Is a disruptive technology called for to solve the mobility, connectivity, and manufacturing challenges of these applications?

At this workshop, FlexTech will address these issues by identifying technology gaps and creating project groups and action items to close the gaps. The workshop includes a tour of Applied Materials AKT plant.

Register now at www.flextech.org

News and news links from the FlexTech Alliance

excerpted from Veritas et Visus newsletters

Universal Display supports establishment of an OLED lighting pilot manufacturing facility in the U.S.
Universal Display, along with Moser Baer Technologies, has been awarded $4,000,000 for a two-year program from the United States Department of Energy (DOE) under the American Recovery and Reinvestment Act of 2009 for a program titled “Creation of a U.S. Phosphorescent OLED Lighting Panel Manufacturing Facility”.

Under the new program, Universal Display will demonstrate the scalability of its proprietary Universal PHOLED technology and materials for the manufacture of white OLED lighting panels that meet commercial lighting targets. Moser Baer Technologies, a U.S. subsidiary of Moser Baer India, will design and build the U.S.-based pilot facility during this program.

This two-year program is part of the DOE’s long-term commitment to advancing the development and introduction of energy-efficient white OLED lighting sources for general illumination. White OLED lighting is viewed as a technology that can introduce highly-efficient, innovative lighting solutions to reduce the global carbon footprint of residential and commercial lighting.
http://www.universaldisplay.com

Plextronics announces critical developments for the organic solar market
Plextronics made two announcements related to the company’s organic solar inks, including the use of Plexcore PV 2000 for energy harvesting applications and a breakthrough manufacturing method that allows for low-temperature processing of organic photovoltaics (OPV).
http://www.plextronics.com

-Plexcore PV2000 is an ink set that will establish OPV as the leading power source for the indoor energy harvesting market. It delivers higher performance across a wide variety of fluorescent lighting conditions compared to amorphous silicon solar cells; contains safe, non-toxic materials unlike the metals found in typical batteries; and will be lower cost than other power sources due to the application of high-throughput, roll-to-roll printing processes for manufacturing. In addition, it shows a 30 to 40 percent increase in indoor power density as compared to conventional organic solar technology.

-As another step toward low-cost manufacturing, Plextronics has developed a breakthrough manufacturing method that allows for low-temperature processing of OPV. While previous industry standard techniques required a glass substrate to be annealed at or above 110° C, the proprietary method developed at Plextronics enables annealing at less than 65^{o} C. This new method is expected to reduce manufacturing costs by enabling the use of less expensive substrates, especially once the process is transferred to flexible substrates such as plastic.

QD Vision acquires Motorola patents covering use of quantum dots in displays and lighting
QD Vision announced it has purchased from Motorola a patent portfolio pertaining to the use of quantum dot technology in display and lighting products. The addition of this portfolio augments QD Vision’s position in quantum dot intellectual property. Included in the acquisition is U.S. Patent No. 5,442,254 of Jaskie, one of the earliest patents on the use of photo luminescent quantum dots in product applications, and pending applications relating to the use of quantum dots to a wide variety of display applications, including LCD backlight units. Prior to this acquisition, QD Vision’s position in quantum dot intellectual property already included nine issued patents and more than 130 patents pending. http://www.qdvision.com

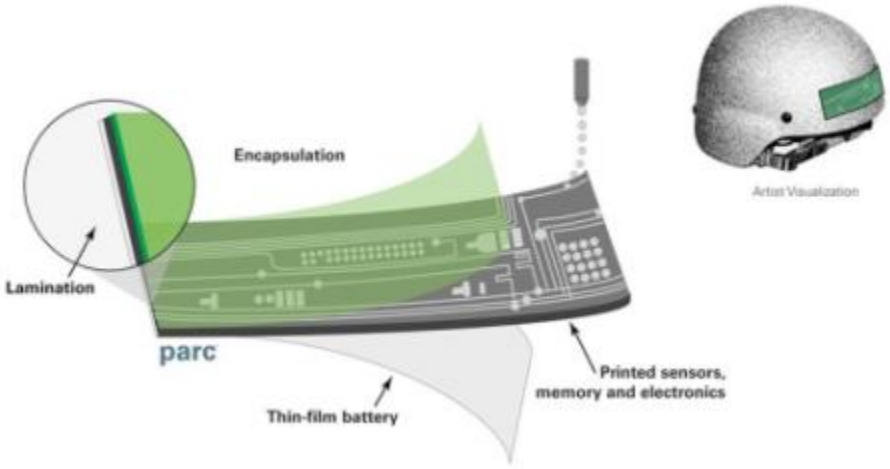
PARC develops battlefield blast meter for DARPA

Since explosive blasts could inflict cumulative head injuries over time to soldiers and emergency responders in the battlefield, the US government's Defense Advanced Research Projects Agency (DARPA) needed to develop an early detection solution that could prevent traumatic brain injury. The dosimeters needed to monitor and record the intensity and frequency of battlefield blasts without requiring maintenance (e.g., additional personnel) in the field – while remaining low cost. No commercial alternative existed that met DARPA's needs. The solution needed to be robust enough to be read after a period of time in the field, yet low-cost enough to be discarded after the data was read. It needed to integrate a variety of sensors in different locations to collect and record the various data associated with the blasts. Furthermore, the sensors would need to conform to the irregular shape of battlefield workers' helmets.

PARC scientists designed and developed the technology for a printed blast dosimeter electronic "tape" that could sense, record, and read back various data associated with exposure to explosive blasts in the battlefield. Comprised of flexible, lightweight patches – which could be mounted on battlefield workers' helmets for a week at a time and remain robust enough to be read later – the tape contains memory, control electronics, and multiple sensors that record pressure waves, acceleration, acoustic levels, and light intensities. Most importantly, the PARC technology yielded results that were comparable to more expensive commercially available sensors, yet the sensor tapes were designed to be fabricated less than one dollar – making them low-cost enough to meet DARPA's requirement for disposability. http://www.parc.com

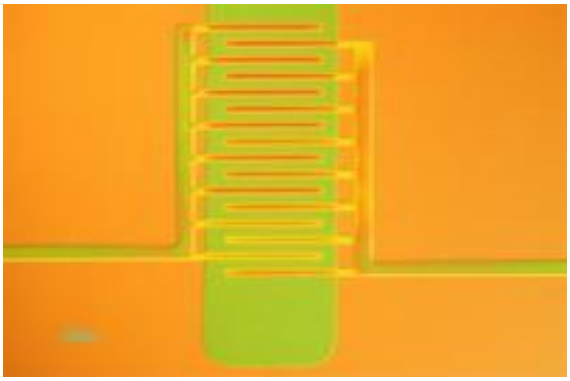
NIST to advance flex initiatives

The National Institute of Standards and Technology (NIST) recently posted a federal funding opportunity "Manufacturing and Biomanufacturing: Materials Advances and Critical Processes". The RFP is under the Technology Innovation Program. Of particular interest to FlexTech member companies is that NIST gives examples of materials to advance displays, batteries, storage devices, electronic inks and other products of the relevant industries. NIST estimates that ~$25M will be available for project funding. http://www.nist.gov/tip/



Princeton demos plastic transistors

Princeton University has ink-jet printed organic conductors, semiconductors and insulators onto a polymer substrate to demonstrate all-plastic transistors that could slash the price of organic solar cells. Researchers invented a new plasticizing process for all-plastic transistors to obsolete the use of rare and expensive indium-tin-oxide (ITO) in solar cells. Conductive polymers have been known for over a decade, but until now dissolving them in a solvent so they could be ink-jet printable also caused their conductivity to drop by up to 1,000 times. The research team discovered that by post-processing ink-jet printed plastic electronics with a special acid, the polymer's internal bonds can be relaxed back to the state they were in before printing, thereby recovering their conducting properties. Similar to the plasticizing process that makes hard plastics softer, the technique regains the loss incurred when conductive polymers are dissolved in a solvent for ink-jet printing. The technique can be adapted immediately to substitute for the ITO used in solar cells. With further development, the technique could also be used for other ink-jet printable electronic applications such as all-plastic large area displays and medical diagnostic devices. http://www.princeton.edu



Princeton researchers have developed a plastic process for ink-jet printing conductive polymers shown here in a plastic transistor with interdigitated source and drain (orange) allowing current flow down the active channel (green).

Image courtesy of Loo Research Group

E Ink and Chilin Technology announce joint partnership

E Ink Corporation and Chilin Technology Corporation, a manufacturer of vertically integrated flat panel displays, announced a partnership to bring low-power industrial and other specialized electrophoretic displays to the marketplace.

The cooperation between the two companies enables solutions that are highly integrated, easy to use and install, and tailored to unique customer environments. The partnership makes the patented E Ink Vizplex imaging film available to Chilin for mass production, distribution, and sales to consumers. The collaboration not only expands E Ink's product offerings but also leverages Chilin's extensive ability to engineer and manufacture low-power customized solutions for the industrial market. Chilin has a history of incorporating the latest technology advances such as RF/Zigbee, barcode functionality, RFID, and advanced sensors into its offerings.

The agreement entails greater cooperation between the two firms to expand the rapidly growing e-paper business.

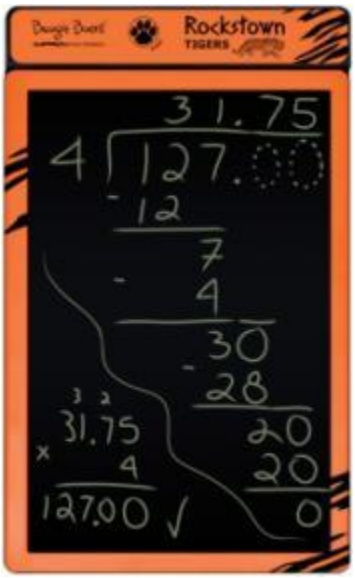
This cooperation will open the door to new small and medium-sized display opportunities in areas as diverse as logistics, signage, medical devices, automation, smart labels, manufacturing, and data collection. One target application for this effort is industrial controls or mobile industrial applications where the low-power and daylight readability qualities of an electronic paper display provide value.

http://www.eink.com
http://www.chilindisplay.com

UDC presents all-phosphorescent white OLED to address commercial white lighting applications
Universal Display Corporation announced advances in white OLED performance on a commercial-scale 15x15cm lighting panel using the company's highly-efficient phosphorescent OLED technology and materials. This new white OLED panel is believed to have the most energy-efficient performance, at this scale, reported to date. Funded in part by the US Department of Energy, Universal Display has been working to scale its record-breaking, research-scale PHOLED results to commercial-sized lighting panels that meet Energy Star targets. This panel emits a warm-white light with a color rendering index (CRI) of 87 and a correlated color temperature (CCT) of 3055K. It also has a luminous efficacy of 50 lumens per watt using an optical out-coupling treatment with a modest 1.5x enhancement factor.

With an operating lifetime of approximately 10,000 hours to 70% of an initial luminance of 1,000cd/m^2, this panel performance has the potential to meet the requirements for a number of initial commercial niche OLED lighting applications, and is an important step toward white OLED panel performance that achieves Energy Star targets. To achieve these results, the company employed a new light-blue PHOLED emitter system. This new light-blue PHOLED system helps reduce the power consumption of the panel and extend its operational lifetime and emission color stability with aging. Added to the company's red and green emitter systems for white lighting, Universal Display can now offer a full set of emitters for certain warm-white OLED lighting applications.
http://www.universaldisplay.com

Kent Displays boosts features of Boogie Board LCD writing tablet
Kent Displays announced it is expanding global distribution and developing new product features for the "Boogie Board Paperless LCD Writing Tablet" based on heavy demand. Kent Displays subsidiary Improv Electronics launched the Boogie Board tablet in the United States in January 2010. It is the first paperless writing tablet to utilize a pressure-sensitive, Reflex LCD from Kent Displays for its writing surface. The Boogie Board tablet is the first of multiple e-paper products to be sold by Improv Electronics. Part of Kent Displays' "Push Green" initiative, the Boogie Board tablet is a paperless device that provides a highly cost-effective vehicle to reduce everyday paper consumption in the home, office, and classroom. While most reduction strategies have focused on computer-related activities, an equally significant amount of memo pads, sticky notes and sketch books are used for writing messages, jotting down ideas, making reminders/lists, etc. Schools are making the Boogie Board tablet a must-have learning aid used in place of note pads, loose leaf paper and chalk, magnetic and dry erase boards for a wide variety of student activities such as handwriting/arithmetic practice, solving equations, and drawing pictures.



The Boogie Board tablet's ease of use has also made it a favorite of individuals with intellectual and physical disabilities, including as a basic means of communication for those with limited speech and hearing. A pilot program allows schools to purchase up to 30 units at a significant discount. Discounts for larger education and institution-related purchases are also available.
http://www.kentdisplays.com

FUJIFILM Dimatix expands capabilities of its materials printer

FUJIFILM Dimatix Inc. introduced its new D-128/1 DPN, a 1pL drop volume printhead and companion D-128/10 DPN, a 10pL model, for use with the Fujifilm Dimatix DMP-3000 printer. The new D-128 DPN printheads build on the installed base of more than 500 Dimatix materials printers installed worldwide. These printers are used for an expanding range of materials deposition applications and developments. Both D-128

The new D-128 DPN printheads from Fujifilm Dimatix

DPN printheads are designed to aid in the orderly progression from experimentation to scale up using the DMP-3000 printer. The DMP-3000 is a non-contact, fluid deposition system capable of jetting a wide range of functional fluids using several options of Fujifilm Dimatix fluid deposition printheads interchangeably, including the new D-128/1 and D-128/10 DPN printheads. The DMP-3000 has a printable area of 300x300mm and maintains a positional accuracy and repeatability of ±5µm and ±1µm, respectively. D-Class printheads have been specifically designed for non-contact printing of functional fluids for applications such as displays, electronics and biotechnology.

D-Class printheads are based on Fujifilm Dimatix's proprietary silicon MEMS (Si-MEMS) technology and use robust silicon material. End-users can utilize the D-128/1 DPN printhead to manufacture products requiring precise feature definitions as small as 20µm, such as silicon-based solar cells and other photovoltaic devices, small-size RFID antennae, organic thin-film transistors (TFTs) and printed circuits. The D-128/1 DPN produces conductive lines and features that are virtually invisible or allow biomaterials to be printed at twice the previously achievable density in a true production mode, opening up new territory in the generation of specialized arrays in a manufacturing setting. The D-128/10 DPN with its larger drop size is used for coarser feature generation.
http://www.dimatix.com

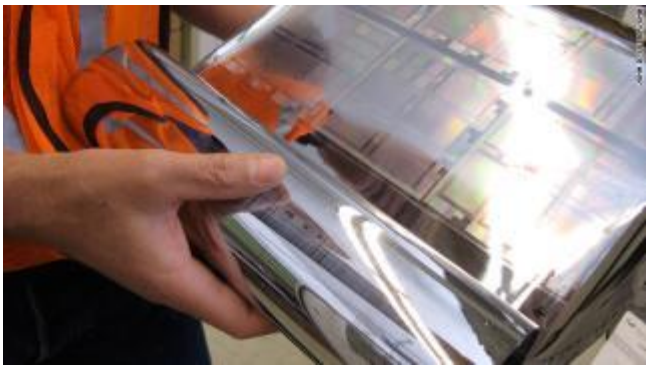
DuPont delivers OLED technology scalable for television

DuPont announced that it has achieved record performance in printed OLED displays, sufficient to enable future adoption of OLED television. Using proprietary DuPont Gen 3 solution OLED materials, DuPont has for the first time demonstrated a solution-based manufacturing process in which OLEDs can be cost effectively printed while delivering The necessary performance and lifetime.

OLED displays are in portable devices available in the market today, but the current high-cost of manufacturing with evaporated materials has limited market adoption, and constrained OLED manufacturing for larger size displays. Now, with DuPont printed OLED materials and process technology, fabrication costs can be significantly reduced, and manufacturing can be scaled to accommodate TV-size displays. DuPont previously announced the development of solution-based OLED materials with record-setting lifetime performance. With the new results, DuPont has now translated its advances in materials science to a scalable manufacturing process where an OLED television operating eight hours per day would last over 15 years. To report these results, DuPont made printed test devices that can be operated at elevated luminance for an accelerated lifetime test. Printed devices using the DuPont process have reliably achieved lifetimes to 50% of initial luminance of 29,000 hours for red, 110,000 hours for green and 34,000 hours for blue at typical television brightness levels.
http://displays.dupont.com

CHA Industries high vacuum deposition system accepted at Binghamton University's CAMM
Binghamton University and The Flex Tech Alliance announced that the CHA Industries Web Coater has been accepted at the Center for Advanced Microelectronics Manufacturing (CAMM). The addition of the web coater to CAMM'S array of R2R microelectronics manufacturing equipment is the culmination of a long-standing relationship between CHA Industries and the Flex Tech Alliance. Almost 2 years ago, CHA Industries was chosen by the Flex Tech Alliance to develop a R2R deposition process tool with web handling capability. The partnership draws on CHA's ability to customize design and engineering to address unique application requirements, such as those specified by the Flex Tech Alliance. Funded by the Army Research Laboratory and cost-shared by CHA and Flex Tech Alliance, the $6M partnership project will advance the capability of U.S. industry in the burgeoning flexible microelectronics market. http://www.chaindustries.com

Sunic partners with Flexible Display Center on OLED manufacturing
Sunic System has become a partner in the FDC at Arizona State University. Sunic will test new materials in conjunction with its manufacturing technology, which can be used for emerging electronics such as OLEDs. The Korean company will deliver machinery to the FDC. http://flexdisplay.asu.edu



HP has developed a process for creating flexible plastic displays that could be used in a number of gadgets

HP develops process that could make a plastic wristwatch
Hewlett-Packard is developing a next-generation wristwatch for the US military. The company says the watch will have a flexible display that shows maps and other strategic information to soldiers in remote combat fields. The watch's screen will be made of plastic and it will run on solar energy, making it less likely to malfunction or run out of power in a tense scenario. The US military plans to use the prototype with a small group of soldiers first before deciding whether to expand its use of the technology. The watch may eliminate the need for soldiers to carry cumbersome technological gear and backup batteries. Flexible solar panels also will be printed onto the watches, using a technology developed by a company called PowerFilm. That company also has developed solar-powered tents for the military. HP said its plastic-display technology could also be used in laptops, e-readers and commercial signs. http://www.hp.com

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