The Dutch Polymer Institute announces the kick-off of a new research programme

Large Area Thin Film Electronics

You are cordially invited to participate to the public kick-off meeting on:

Date:	**Thursday March 6th 2008**
Time:	**10.30 – 16.00, including buffet lunch**
Location:	**Dorgelo room, building Traverse (TR campus map)** **Eindhoven University of Technology** **Den Dolech 2, 5600 AX Eindhoven, The Netherlands**
Registration:	s.koenders@polymers.nl **(free of charge)**

All recently granted projects will present topics that will be explored in the coming years. It is time to join now!

Programme:

10.30 – 11.00	*Reception, coffee/tea.*	
11.00 – 11.15	Welcome and introduction to the Large Area Thin Film Electronics research programme of the Dutch Polymer Institute.	Dr. John van Haare (Programme Area Coordinator)
11.15 – 11.45	#663: Initiated chemical vapour deposition of polymer interlayers for ultra-high moisture diffusion barrier systems.	Prof. Richard van de Sanden Dr. Mariadriane Creatore (TU Eindhoven)
11.45 – 12.15	#659 Crosslinkable Semiconductors for Robust Polymer Electronics.	Prof. Klaus Meerholz (Univ. of Cologne)
12.15 – 13.15	*Buffet lunch*	
13.15 – 13.45	#618 Polymer Light-Emitting Diodes with Doped Charge Transport Layers.	Prof. Paul Blom Dr. Bert de Boer (Univ. of Groningen)
13.45 – 14.15	#640 Engineering the morphology of organic (semi-)conductor layers.	Prof. Anton Darhuber (TU Eindhoven)
14.15 – 14.45	#664 Composite π-π stacked organic semiconductors: materials and processing towards large area electronics.	Prof. Dirk Broer (TU Eindhoven) Dr. Nathalie Stingelin-Stutzmann (Queen Mary London)
14.45 – 15.15	*Refreshment*	
15.15 – 16.00	Round table discussion.	
16.00	Closure	

Public summaries of all granted projects are enclosed to this invitation.

DPI Technology Area Large Area Thin Film Electronics

The Technology Area (TA) Large Area Thin Film Electronics was raised July 1st 2006. The objectives of the TA have been defined together with the industrial partners *Philips*, *OTB Display* and the *Holst Centre*. The TA has built its own research portfolio by requesting and granting research proposals as well as approaching academic groups with proven track record in this field. For future growth the TA very much welcomes new industrial partners.

The Large Area Thin Film Electronics research programme focuses on *fundamental issues* related to *processing for large area deposition* predominantly for solid state lighting applications. Moreover, Large Area Thin Film Electronics opens possibilities for high-risk high-rewarding research on *development of disruptive new device concepts* showing improved reliability combined with robust processing. The created fundamental knowledge should facilitate reliable production of solid state lighting panels and, at the longer term, contribute to the development of thin film sensor devices.

Large area material deposition using solution processing

The objective is studying fundamental issues of large area polymer material deposition using solution processing (gravure, roll-to-roll, slot-die, screen, etc.) to realise the transition from labscale to industrial scale for reliable production of devices. Although labscale devices demonstrate ultimate performance, lack of industrial processes and fundamental knowledge about large area material deposition from solution are hampering commercialisation.

Disruptive device architectures

The objective is developing disruptive device architectures for more reliable and easier production of large area solid-state lighting devices. Current device architectures put very strict demands on processing and production resulting in poor yields. New device architectures allowing more robust processing without affecting device performance (efficiency, homogeneity of light-output) are of high interest.

Dutch Polymer Institute

The Dutch Polymer Institute (www.polymers.nl) is a public-private partnership of a large number of industries, research institutes and universities, with the mission to be a scientifically and technologically leading institute within Europe for industrially relevant polymer research. In a virtual organisation, in a chain-of-knowledge approach and with stimulus of the Dutch government it carries out a generic research programme of strategic technological relevance, mainly with PhD and Post-doc positions in universities and institutes in The Netherlands, across Europe and abroad.

DPI Programme Area Coordinator for Large Area Thin Film Electronics

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Public summaries of running research projects
Technology Area Large Area Thin Film Electronics

Project #	: #618
Project title	: Polymer Light-Emitting Diodes with Doped Charge Transport Layers.
Acronym	: DCT–pLEDs
Institute	: Zernike Institute for Advanced Materials – University of Groningen.
Applicants	: Prof. P.W.M. Blom and Dr. B. de Boer
Duration	: 4 years

Public abstract

State-of-the-art polymer light-emitting diodes (pLEDs) consist of only one active layer that governs all the processes of electron transport, hole transport and emission. In a device with a single active layer it is difficult to balance the charge transport and control the position of the emission zone inside the pLED. Recently it has been demonstrated that polymer layers can be spin coated on top of each other by chemically tailoring of the solubility making multilayer pLEDs possible. However, a problem turned out to be that the voltage drop across the hole and/or electron transporting layers is about 1/3 of the total applied voltage, which leads to a reduced performance. The objective of this project is to overcome this potential loss by achieving doped polymer layers in which the amount of dopant is controllable. The mechanism of doping will be investigated. A second objective is the application of doped electron blocking layers in a multilayer pLED. The project will address whether such a doped layer indeed leads to an improved efficiency and whether dopants do or do not diffuse into the light-emitting layer.

Project #	: #640
Project title	: Engineering the morphology of organic (semi-)conductor layers.
Acronym	: E-Morph
Institute	: Department of Applied Physics, Eindhoven University of Technology.
Applicants	: Prof. A.A. Darhuber and Dr. P. van der Schoot
Duration	: 4 years

Public abstract

Die-coating is a common technique in industry for the deposition of thin liquid films with a thickness between 1 and 20 µm suitable for both rigid and deformable substrates. For the manufacture of large-area lighting devices based on light emitting polymers (LEPs), the deposited liquid film thickness must be approx. 100 times larger than the desired LEP layer thickness due to the limited solubility of LEPs in organic solvents. The subsequent evaporation of the solvent is in most cases a non-uniform process with higher vapour fluxes at corners and edges, thus inducing undesirable LEP redistribution. In operational pLED devices it can lead to an unacceptable inhomogeneous brightness.

The objectives of this project are threefold:

- Investigate and optimize the hydrodynamics of die-coating to fabricate PEDOT and pLED layers of uniform thickness and composition based on solution-processing of large area devices (typical 5x5 cm);
- Investigate means to enhance the influence of surface energy patterns at high coating speeds;
- Mitigate/eliminate evaporation-driven material redistribution.

Project #	: #659
Project title	: Crosslinkable Semiconductors for Robust Polymer Electronics.
Acronym	: –
Institute	: Institute for Physical Chemistry, University of Cologne.
Applicants	: Prof. K. Meerholz and Dr. H. Klesper
Duration	: 1.5 years; possibly extended with 4 years

Public abstract

The probability for failure increases with surface area for pLEDs. Electrical shorts are a major issue in the development of pLEDs for solid state lighting, because a large surface area becomes inactive upon occurrence of one short-circuit. Electrical shorts often result from small contaminations on the surface prior to deposition of polymer layers. However, not all contaminations eventually result in shorts, and not all shorts occur early in the lifetime of the device . The objective is to study the local device degradation *prior to the occurrence of a short-circuit* using sophisticated scanning surface-plasmon (SPR) imaging. After failure the shorted areas will be analysed by local probe techniques. This project should generate fundamental understanding of short formation, come-up with chemical and physical measures to prevent short formation or reliably predict short formation.

Project #	: #663
Project title	: Initiated chemical vapour deposition of polymer interlayers for ultra-high moisture diffusion barrier systems.
Acronym	: POLYMOBAS
Institute	: Department of Applied Physics, Eindhoven University of Technology.
Applicants	: Prof. R. van de Sanden and Dr. M Creatore
Duration	: 4 years

Public abstract

Amongst the challenges and emerging technologies in the field of electronic displays/lighting and flexible electronics, the research on the “ultimate gas/vapour barrier performance” which allows long term stability devices is presently withdrawing considerable attention. The state-of-the art is a µm thick multi-layer system, often consisting of an inorganic layer, which is considered the effective gas/vapour barrier, and an organic layer, which role is still under debate and not yet unravelled.

The POLYMOBAS research proposal aims to gain insight into the role of the organic interlayer in affecting the gas/vapor permeation mechanisms in the stack by investigating the effects of its chemistry, density/porosity and surface morphology on the final barrier performances. The chosen model chemistry in this project is a SiO_2-based multi-layer system deposited by means of a novel, combined initiated-CVD/ plasma- enhanced CVD set up, which couples the development of an organic layer according to a vacuum-compatible free radical- based polymerization process (initiated-CVD) with the plasma deposition of the inorganic barrier layer.

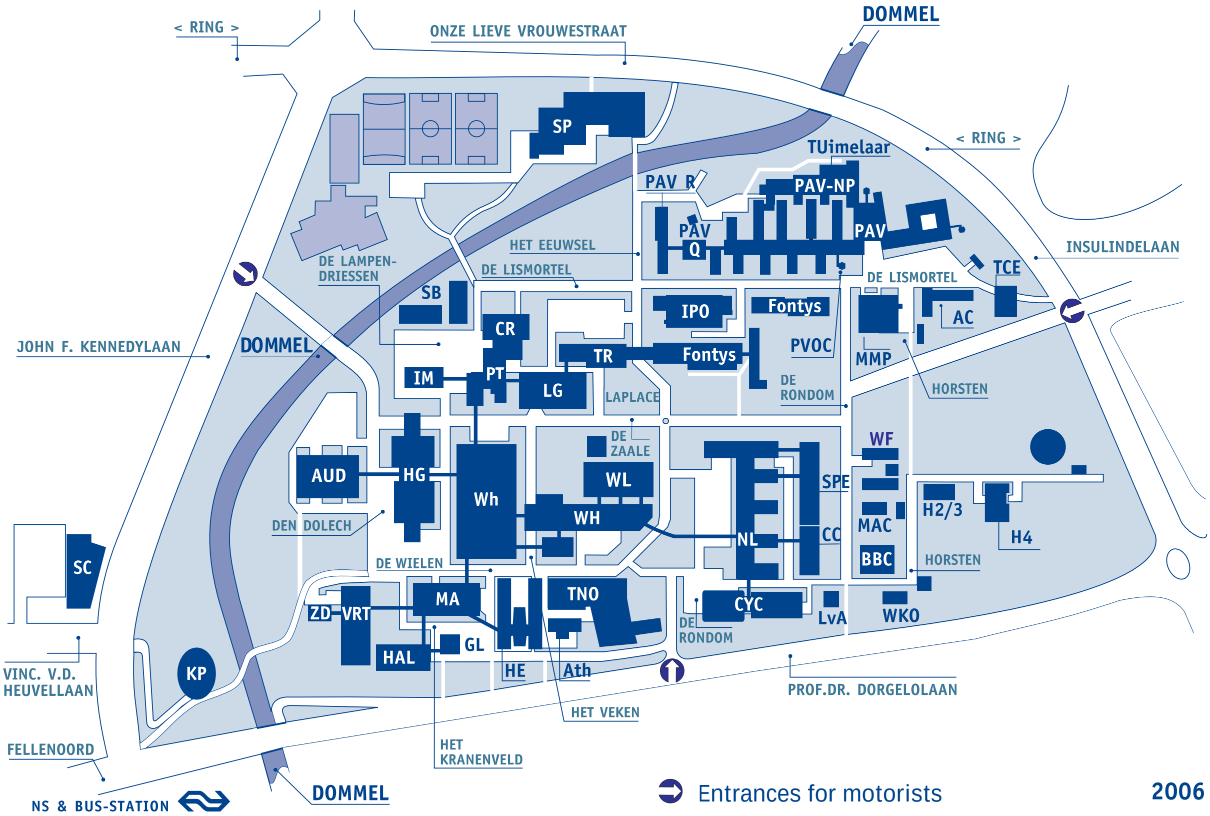
Project #	: #664
Project title	: Composite π-π stacked organic semiconductors: materials and processing towards large area electronics.
Acronym	: PiCOS
Institutes	: Department of Applied Physics, Eindhoven University of Technology. Centre for Materials Research, Queen Mary University London. Chemical Engineering and Chemistry, Eindhoven University of Technology.
Applicants	: Prof. D.J. Broer, Prof. A.A. Darhuber, Dr. A. Stingelin-Stutzmann
Duration	: 4 years

Public abstract

Triisopropylsilylethynyl pentacene (TIPS-PEN) and its derivatives are presently known to be among the best organic semiconducting materials with respect to charge mobility and stability in air. In solution phase, they tend to form pre-packed assemblies that can be aligned when applied on the device substrate using controlled flow and solvent evaporation. The single crystal-like structures thus formed, are reported to have a field-effect mobility from 0.3 cm2/V.s up to 1.4 cm2/V.s. The experience so far is that solvent based processing is still challenging as it often leads to defects and director variations, leading to varying alignment of the supramolecular assemblies and spread in performance even within adjacent transistors applied on the same substrate. The goal of this project is to develop processes to obtain monolithic alignment of one dimensional π-π stacked organic semiconductors that are compatible with large-scale manufacturing. The project aims to enhance and stabilize molecular alignment by generating a self-organizing polymer composite that is formed in-situ from solution. Important aspects are an optimized phase behaviour of the complex TIP-PEN/polymer cq. monomer solutions and the foreseen controlled stratification processes during drying. The quality of the layer will be verified by measuring the organic field effect transistor (OFET) performance.

TU/e technische universiteit eindhoven

TU/e campus



To reach your destination, please follow one of the routes mentioned below:

- De Zaale (red)
- De Wielen (green)
- De Lismortel (yellow)
- Het Eeuwsel (purple)
- De Rondom (blue)

Destination	Building	Route	Parking no
Technische universiteit:			
Department of Applied Physics	N-laag (NL)	De Wielen	11
Department of Architecture, Building and Planning	Vertigo (VRT)	De Wielen	6
Department of Biomedical Engineering	W-hoog (WH)	De Wielen	9/10
Department of Chemical Engineering and Chemistry	Helix (HE)	De Wielen	8
Department of Electrical Engineering	Potentiaal (PT)	De Zaale	2
Department of Industrial Design	Hoofdgebouw (HG)	De Wielen	6/7
Department of Mathematics and Computer Science	Hoofdgebouw (HG)	De Wielen	6/7
Department of Mechanical Engineering	W-hoog (WH)	De Wielen	9/10
Department of Technology Management	Paviljoen (PAV)	De Lismortel	5
Dispatch	BBC (BBC)	De Rondom	
Library	De Hal (HAL)	De Wielen	8
Main Entrance	Hoofdgebouw (HG)	De Wielen	6/7
Stan Ackermans Institute	Hoofdgebouw (HG)	De Wielen	6/7
GE Healthcare	Cyclotron (CYC) (GE Healthcare)	De Rondom	11
Fontys Hogescholen:			
Facilitair Bedrijf	Fontys S1	Het Eeuwsel	3
Bedrijfskader	Fontys S2	De Lismortel	3
Bedrijfskunde en Logistiek	Fontys S2	De Lismortel	3
PABO Eindhoven	Fontys S3	De Lismortel	3
Pedagogisch Technische Hogeschool	Fontys H2 / H3 / H4	De Rondom	
Pedagogisch Technische Hogeschool	Fontys S2	De Lismortel	3
Kennispoort	Kennispoort (KP)	De Wielen	
Meulensteen Art Centre	Meulensteen art centre (MAC)	De Rondom	
TNO Industrie	TNO industrie (TNO)	De Rondom	tno
TU/e Innovation Lab	Multimedia paviljoen (MMP)	De Lismortel	5
Twinning Center	Twinning center (TWC)	De Lismortel	twinning

Building by name

Building	Abbr.	Route	Parking no
Alphacentrum	AC	De Lismortel	5
Arubahal	AH	De Rondom	
Athene	Ath	De Wielen	
Auditorium	AUD	De Zaale	1
BBC	BBC	De Rondom	
Cascade (via N-laag)	CC	De Wielen	11
Corona (via Potentiaal)	CR	De Zaale	2
Cyclotron (GE Healthcare)	CYC	De Rondom	11
Cyclotron (TU/e) (via N-laag)	CYC	De Wielen	11
De Hal	HAL	De Wielen	8
De Zwarte Doos	ZD	De Wielen	6
Fontys	H2, H3, H4	De Rondom	
Fontys	S1	Het Eeuwsel	3
Fontys	S2, S3	De Lismortel	3
Gaslab	GL	De Wielen	8
Helix	HE	De Wielen	8
Hoofdgebouw	HG	De Wielen	6/7
Impuls (via Potentiaal)	IM	De Zaale	2
IPO-gebouw	IPO	Het Eeuwsel	3
Kennispoort	KP	De Wielen	
Lab voor Akoestiek	LvA	De Rondom	
Laplace-gebouw	LG	De Zaale	3
Matrix (via Helix)	MA	De Wielen	7
Meulensteen Art Centre	MAC	De Rondom	
Multimediapaviljoen	MMP	De Lismortel	5
N-laag	NL	De Wielen	1
Omega-paviljoen		De Lismortel	5
Paviljoen	PAV	De Lismortel	5
	PAV-Q	Het Eeuwsel	3
	PAV-R	Het Eeuwsel	3
Potentiaal	PT	De Zaale	2
PVOC	PVOC	De Lismortel	
Reststoffencentrum		De Rondom	
Spaceboxen	SB	De Zaale	2
Spectrum (via N-laag)	SPE	De Wielen	11
Sportcentrum	SP	Het Eeuwsel	3
TNO Industrie	TNO	De Rondom	tno
Traverse	TR	De Zaale	3
TUimelaar	PAV-NP	Het Eeuwsel	4
Twinning Center	TWC	De Lismortel	twinning
Vertigo	VRT	De Wielen	6
Werf	WF	De Rondom	
W-hal (via Hoofdgebouw)	Wh	De Wielen	7/9
W-hoog	WH	De Wielen	9/10
W-laag, (via W-hoog)	WL	De Wielen	9/10

How to get to the Technische Universiteit Eindhoven

By plane

You can get direct flights to Eindhoven Airport (Welschap) from various cities in Europe: Amsterdam, Maastricht, London, Birmingham, Manchester, Paris, Zurich, Frankfurt, Hamburg and Strassbourg.

By train

Railway connections to and from Eindhoven

You can reach the university quite easily by train. The university buildings are situated near the railway station. Leaving the platform, you go down the stairs and turn to the right. You leave the building on the north side, facing the bus station. The university buildings are to be found at the north-east and are a five minutes walk.

By car

There are plenty of parking places in the vicinity of various buildings. At a charge you can park here.

From 's-Hertogenbosch, Motorway A2/N2:

At the intersection 'Ekkersweijer' take the motorway A58 and follow the signs 'Centrum'. Keep driving in this direction. Soon after the signs with the word 'universiteit' will appear. After crossing the ringroad 'Ring' you see the sign 'universiteit'. Take the turn-off to the left.

From Maastricht, Motorway A2 and from Venlo or Antwerpen, Motorway A67:

At the intersection Leenderheide you follow the signs 'Centrum/Tongelre'. When you arrive in Eindhoven, you take the second exit on the roundabout. Go straight on. At the second set of traffic lights you follow the signs 'Nijmegen/'s-Hertogenbosch'. Keep driving in this direction (across a canal and under a railway). Soon after that signs with the word 'universiteit' will appear. Immediately after the next roundabout you see the sign 'universiteit'. Take the turn-off to the left.

From Tilburg, Motorway A58:

At the intersection 'Batadorp' you take the exit 'Randweg Eindhoven(Noord)/Centrum' and at the intersection 'Ekkersweijer' the exit 'Randweg Eindhoven/Centrum'. Then you keep following the signs with 'centrum' (motorway A58). After crossing the ringroad 'Ring' you see the sign 'universiteit'. Take the turn-off to the left.

From Nijmegen, Motorway A50:

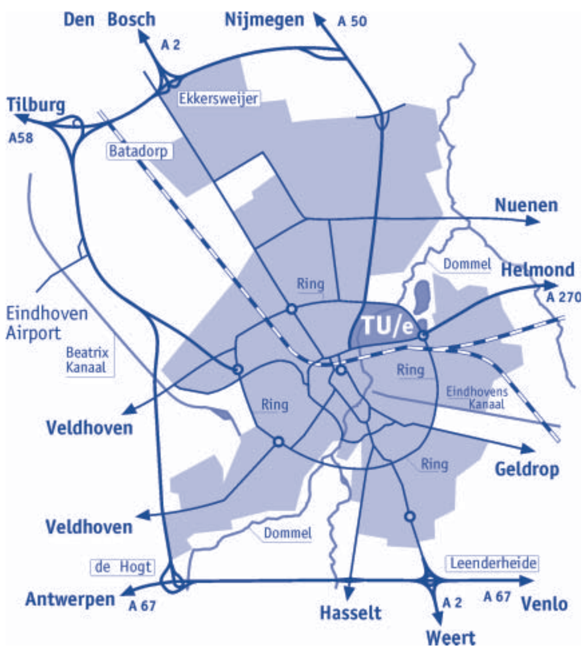
At the end of the motorway A50, at Ekkersrijt, you drive straight ahead. Then follow the signs 'Centrum' and after that 'universiteit'. Directly after crossing the ringroad ('ring') you see a signpost pointing you in the direction of 'universiteit' (to the left).

From Helmond, Motorway A270:

When you arrive in Eindhoven, take the first exit on the roundabout towards 'Ring/universiteit/'s-Hertogenbosch/Tilburg'. After this roundabout you see the sign 'universiteit'. Take the turn-off to the left.

By train

By car



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