SmartKem
Display • Performance • Chemistry

Introducing SmartKem®

OTCQB: SMTK

Our transistors your advantage

13/10/2021

smartkem.com

Forward Looking Statements

This presentation contains forward-looking statements about SmartKem Inc. based on management's current expectations which are subject to known and unknown uncertainties and risks.

Words such as **"anticipated," "initiate," "expect," "intend," "plan," "believe," "seek," "estimate," "may,"** and variations of these words or similar expressions are intended to identify forward-looking statements. Our actual results could differ materially from those discussed due to a number of factors, including, but not limited to, our ability to raise additional equity and debt financing on favorable terms, the success of our products under development and other risk factors.

We are providing this information as of the date of this presentation and do not undertake any obligation to update any forward-looking statements contained in this presentation as a result of new information, future events or otherwise. Unless the context requires otherwise, references to "SmartKem," "Company," "we," "us" and "our" refer to SmartKem Inc.

Executive Summary

Enabling flexible electronics today

Market Leading Disruptive Technology

Recognized as the world-leading electronic material for organic transistors

TRUFLEX® is a full transistor stack design and process platform

- Owns Chemistry, Process and Stack design rules, proven to produce logic circuits at only 80˚C with performance significantly beyond amorphous Silicon (aSi)
- Validated SPICE model and Process Design Kit (PDK)
- Currently under review for multiple use cases and 2D array sensor applications

Flexible and can be produced on low cost plastic and glass

Compatible with existing manufacturing lines or the printing processes that industry plans to replace them with

Private and institutional investors including, AIGH, Octopus Ventures, Entrepreneurs Fund LP, BASF Ventures

World Class Technology Team

41 (11 PhDs) FTEs with 200+ combined years industrial and R&D pedigree at ICI, Merck, Philips, Kodak, CDT, Motorola, Global Foundries

Having developed the chemistry, process and the design rules, SmartKem is an outsourced manufacturer of its unique technology

Extensive, Broad and Defendable IP Portfolio

>160 patents across 16 patent families – 104 granted and >55 pending

30 codified trade secrets

SmartKem Has Traction

Traction at multiple technology companies producing OTFT based circuits including Mini-LED Backlights & sensors

Launched first demonstrator at SID 2020

Company **Overview**

Enabling flexible electronics today

Founded in 2009

Employees: 41 FTEs including 11 PhDs

Went public in March 2021 raising $25m

200+ PhD man years in the development of organic semiconductor materials

8,000ft2 research and development facility in Manchester, UK

Foundry service for prototyping at UK's Centre for Process Innovation (CPI)

Extensive IP portfolio comprising 16 patent families (>160 patents – 104 granted and >55 pending) and 30 codified company trade secrets

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SmartKem Leadership Team

Ian Jenks
Chairman & CEO

Ian has more than 30 years of Board-level experience in Industrial Technology, both as an investor and as Chief Executive Officer of companies operating in the US and Europe. He was formerly the Senior independent director of Paysafe plc, a partner in west coast venture capital firm Crescendo Ventures LLP, Chairman of Nasdaq listed Oplink Communications Inc and President of Uniphase Inc. Ian holds a BSc in aeronautical engineering.

Dr Beverley Brown
Chief Scientist

Dr Brown is considered to be a world-leading expert in the field of organic semiconductor technology. Having worked in the technology area of Printable Electronics since its inception almost 20 years ago, she holds a PhD in Organic Chemistry from the University of Glasgow and spent 18 years at ICI plc, as well as established a world class multi-disciplinary plastics electronics research team at Avecia (Merck).

Dr Simon Ogier
(Fellow of the Institute of Physics)
CTO

Simon is an internationally recognised expert in the field of organic thin film transistors. Since 2001 he has worked to develop high performance organic semiconductors for transistor applications within companies such as Avecia, Merck, CPI and more recently with NeuDrive Limited. Simon has co-authored 26 journal articles, is a co-inventor on 15 patent families, and serves as an active member of the IEC TC119 standards committee for Printed Electronics.

Robert Bahns
CFO

With a degree in Electrical Sciences from Cambridge University and an MBA from INSEAD, Robert was previously the CFO of WaveOptics and has 20 years' experience in venture capital at Nomura Int. and Touchstone Innovations in communications & hardware markets.

Hugh Baker-Smith
CCO

Having over 20 years' experience in licensing and commercialisation of products including printed electronics, consumer electronics, inkjet and smart city networks, Hugh has a consistent career track record of delivering revenue growth on a global basis.

Sri Peruvemba
CMO

Previously Chief Marketing Officer for E Ink Holdings, Sri played a major role in transforming the $15M start-up to a $1B+ global company. With over 30 years' experience in technology, Sri has held senior level positions at Sharp Corp, Cambrios, TFS Inc., Planar Systems, and Novasentis.

Chip shortage will drag on ‘for some time’, Chinese ministry warns, as country looks to boost semiconductor support

“Chip shortage drags on as plant closures hit carmakers”

Global shortage in computer chips 'reaches crisis point'

Semiconductor Shortage Is Far From Over, But These Stocks Stand To Gain

Major automakers fear the global chip shortage could persist for some time

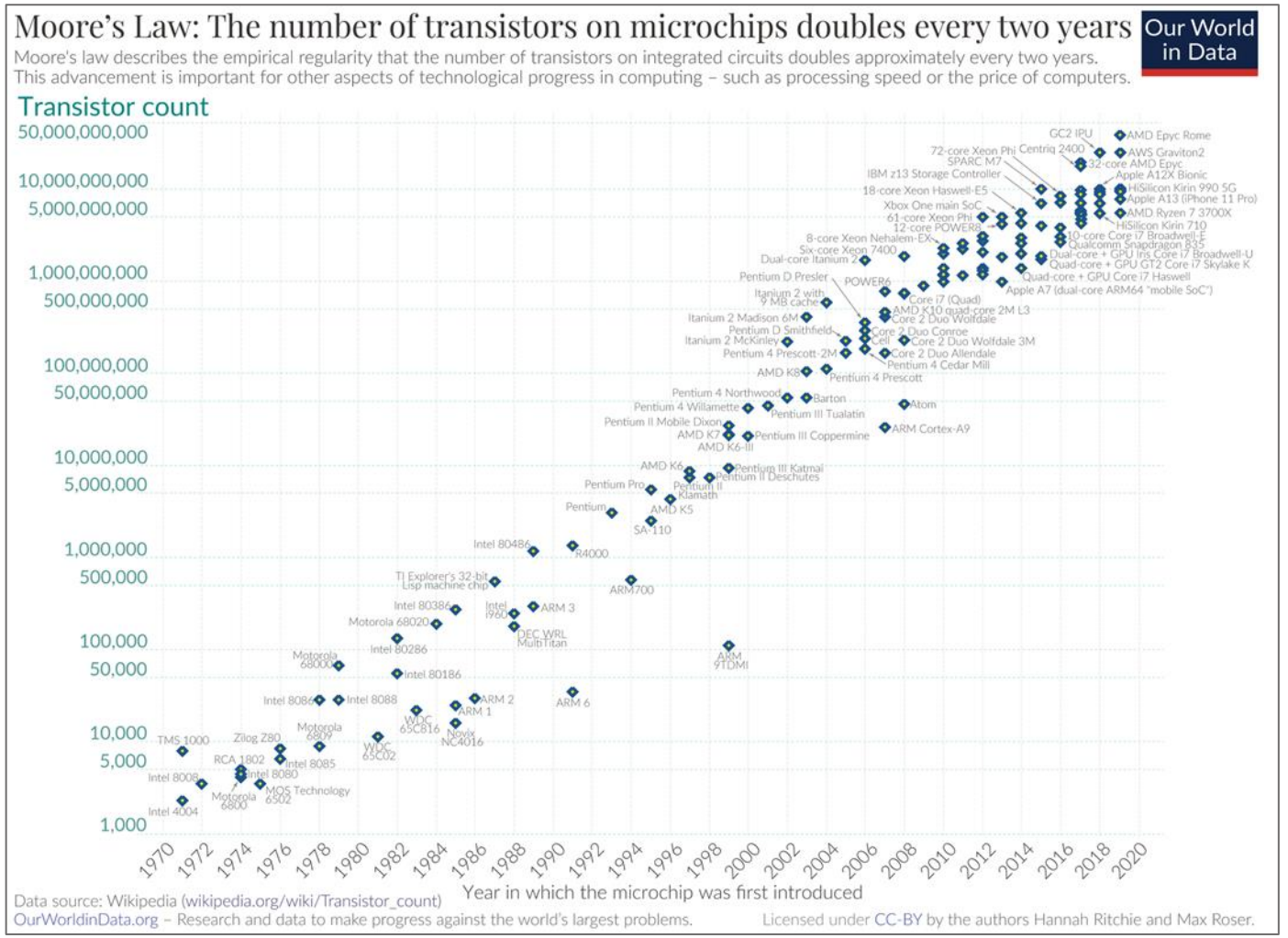
“Just when you thought the chip shortage was over…”

Why is there a chip shortage?

What’s behind the chip shortage?

Moore's Law

- Moore's law is the observation that the number of transistor in a dense integrated circuit (IC) doubles about every two years. It is an observation and projection of an historical trend. Rather than a law of physics, it is an empirical relationship linked to gains from experience in production.



SmartKem OTFT Outperforms Large Scale Competition

Parameter	SmartKem OTFT	a-Si	IGZO	LTPS
Current Usage	**In development (demonstrated in e-paper, LCD and OLED)**	LCD and rigid e-paper	OLED TV and some tablet LCD	Mobile phone (OLED and some LCD)
Typical Charge Mobility in Display Pixel	**3 cm^2/Vs**	0.5 cm^2/Vs	10 cm^2/Vs	50+ cm^2/Vs
Process Temperature	**80˚C***	300 ˚C	320 ˚C	350 ˚C
Substrate Compatibility	**Wide range of plastics and glass**	Glass	PI/glass	PI/glass
Current Driving Stability	**Very Good**	Average	Very Good	Excellent
Off Current	**Excellent**	Average	Excellent	Average
Impact Resistance	**Excellent**	Poor	Poor	Poor
Bend Radius	**0.5mm**	4mm	2mm	4mm
Manufacturing Maturity	**Prototype**	Excellent	Fair	Good
Process Cost	**Low**	Low	Medium/High	Medium/High

Convergence For **Mass Deployment** Success

1
TRUFLEX® Organic INKS

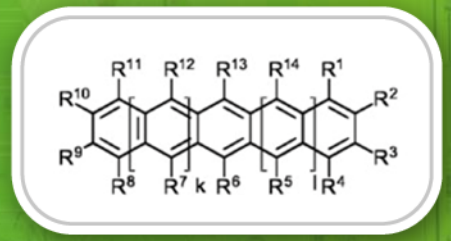
2
TRUFLEX® Design Tools

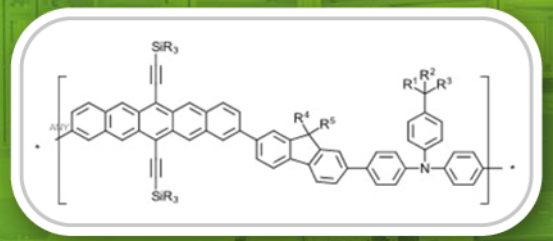
3
TRUFLEX® Foundry Services

Mass Deployment

1. **TRUFLEX® Inks** – Ready at Scale

Components of TRUFLEX® Inks





High Mobility, Small Molecule

Intrinsic mobility ≥20 cm2/Vs

Semiconducting Polymer 'Controls'

Morphology of OSC layer
Phase segregation & uniformity of SM
Viscosity of ink

Solvents

Solubilise SM & Binder
Modify surface tension
Influence ink viscosity
Solvents for printing

Technical team has excellent understanding of formulations

In-depth knowledge of how to combine small molecule/polymer/additives to maximise the performance of OSC layer and resulting oTFT

More than 50 years expertise relating to OSC formulation

Best in class performance

Compatible with existing industrial process lines

Scaled up manufacture

2. **TRUFLEX® Electrical Design Automation Tools** – In Beta Development

EDA Components to Libraries

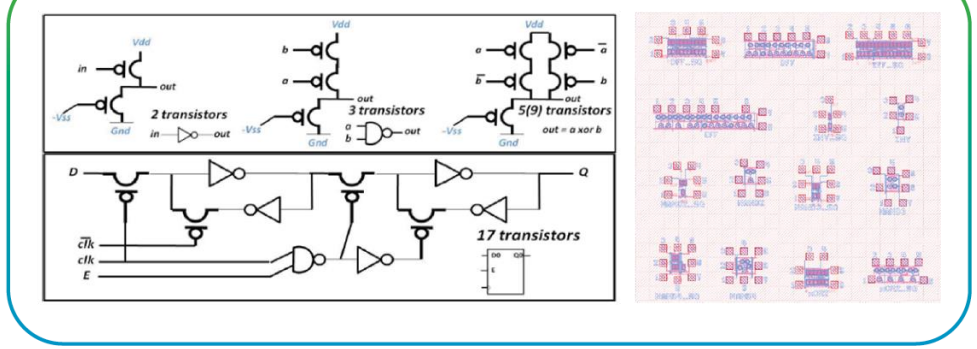
Follows elements of the silicon approach for commercialisation

EDA tools establishment

PDK (Process Design Kit) establishment (at PE foundries)

- Standard cells – parameterizable cells (p-cells)
- Libraries of circuits and other PE devices (force sensor, OLED, OPD, biosensor etc)
- Gate arrays and ink-jet gate arrays (rapid customisation)

Device	PCell name	Design parameters	Symbol	Layout
Resistor	rlin_lw rlin_rw	**w** strip width **l** strip length / **r** resistance		
	rsnake_lwz rsnake_rwz	**w** strip width **z** meanders number **l** vertical bars length / **r** resistance		
Capacitor	cap_lw cap_cw	**w** upper plate width **l** upper platelength / **c** capacitance		
Inductor	indsq_srwnt	**s** turns spacing **r** interior turn radius **w** turns width **nt** number turns		
	indoct_srwnt	**s** turns spacing **r** interior turn radius **w** turns width **nt** number turns		
Diode	diode_lw	**l** upper contact length **w** upper contact width		
Transistor	potft_wl	**l** channel length **w** channel width		



3. **TRUFLEX® Foundry Services** – Gen 2.5 Line

CPI G2.5 Prototyping facility for materials qualification, process development & fabrication

Adding digital lithography for full-custom circuits - sheet to sheet initially and then **roll-to-roll** in the future

Market Entry **Strategy**

1 TRUFLEX® Organic INKS

Business Model	Target Customers
UDC (OLED)	Samsung, LG, AUO, BOE, Innolux etc.

2 TRUFLEX® Design Tools

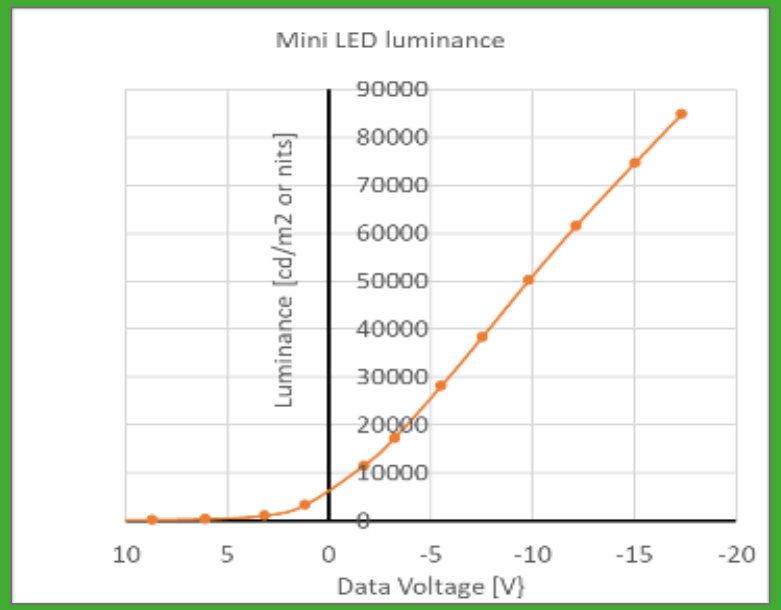
Business Model	Target Customers
Synopsys (SNPS) Cadence (CDNS)	Samsung, LG, AUO, BOE, Innolux, Dolby, Apple, Sony etc.

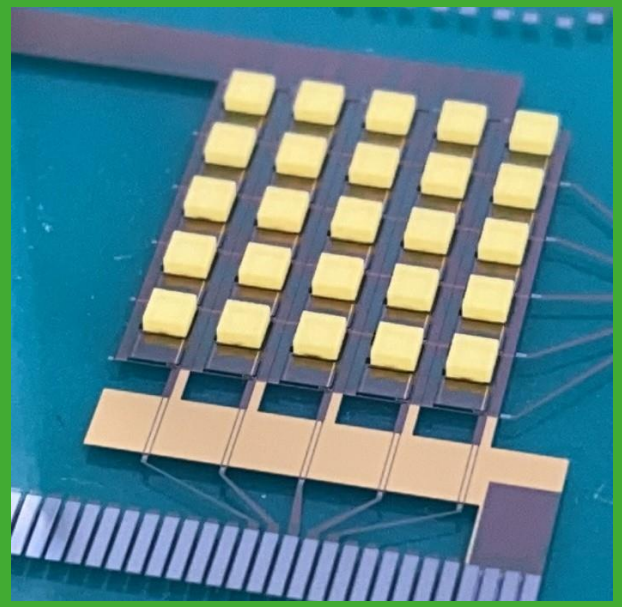
3 TRUFLEX® Foundry Services

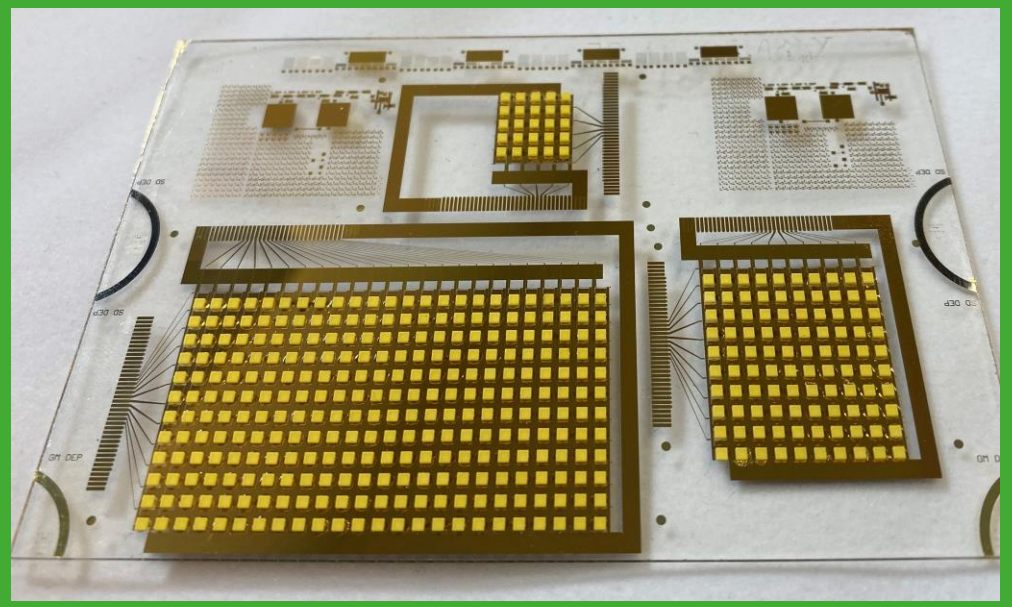
Business Model	Target Customers
TSMC (TSM:US)	Dolby, Apple, Sony etc.

Demonstrators – **Mini-LED backlights**

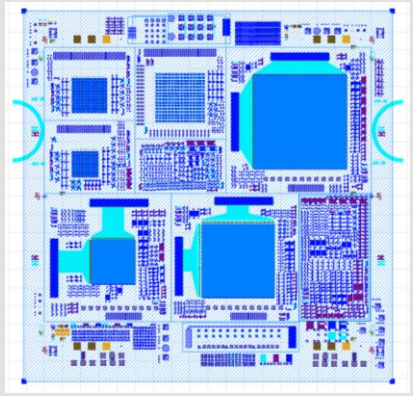
- LEDs attached to OTFT backplane using pick-and-place
- Flexible connectors tab bonded to custom driver electronics

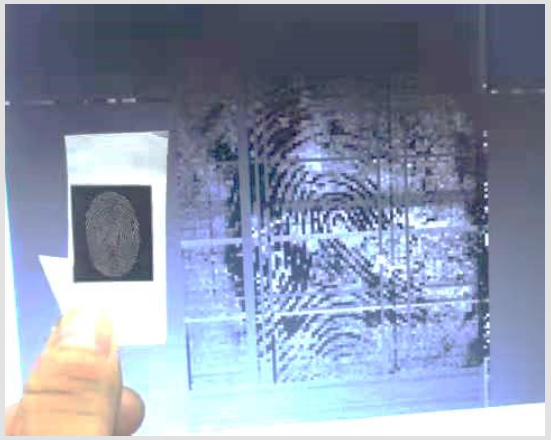






Demonstrators – **Mini-LED backlights**





Pseudo **CMOS**

- *Pseudo CMOS* is a term for designs of logic that emulate some of the benefits of CMOS but often use NMOS or PMOS only transistors (hence avoid the processing complexity)
- Pseudo CMOS approach will follow the work of IMEC which showed that it is possible to widen the noise margin of transistors using dual gate OTFT technology to make 2 types of OTFT with different threshold voltages

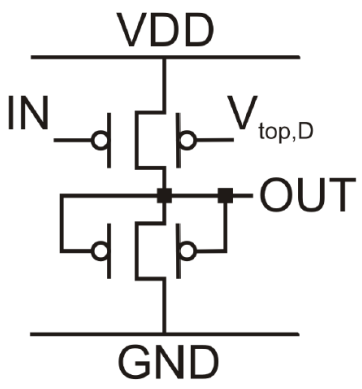
Advantage

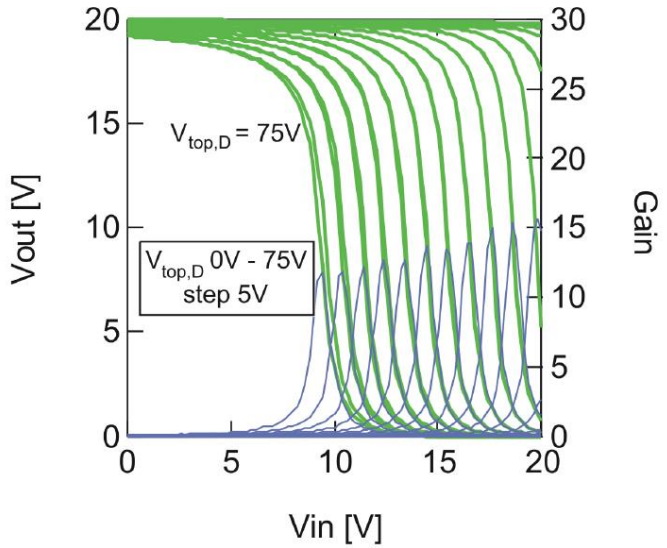
- Can integrate many transistors in a circuit without failure due to Vt variations
- Only requires 1 more mask than PMOS only

2010 IEEE International Solid-State Circuits Conference

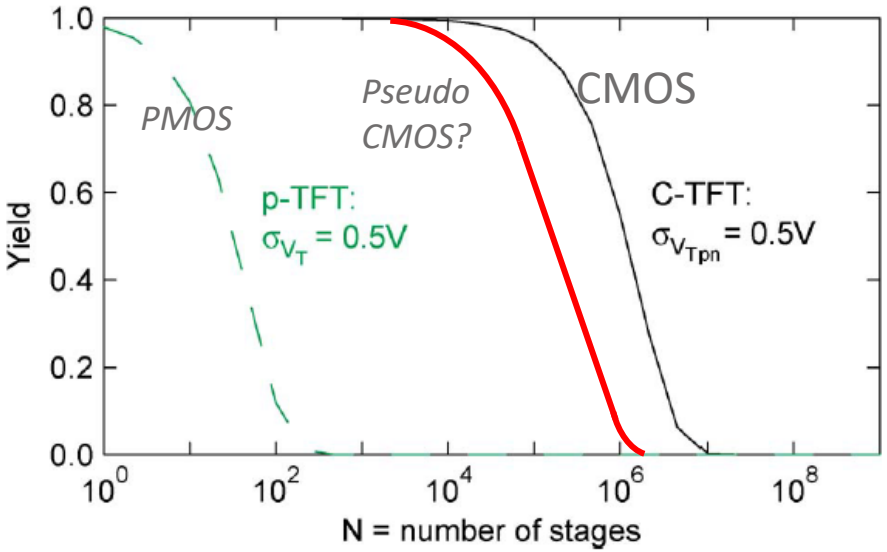
7.4 Robust Digital Design in Organic Electronics by Dual-Gate Technology

Kris Myny[1,2,5], Monique J. Beenhakkers[3], Nick A. J. M. van Aerle[3], Gerwin H. Gelinck[4], Jan Genoe[1,5], Wim Dehaene[1,2], Paul Heremans[1,2]



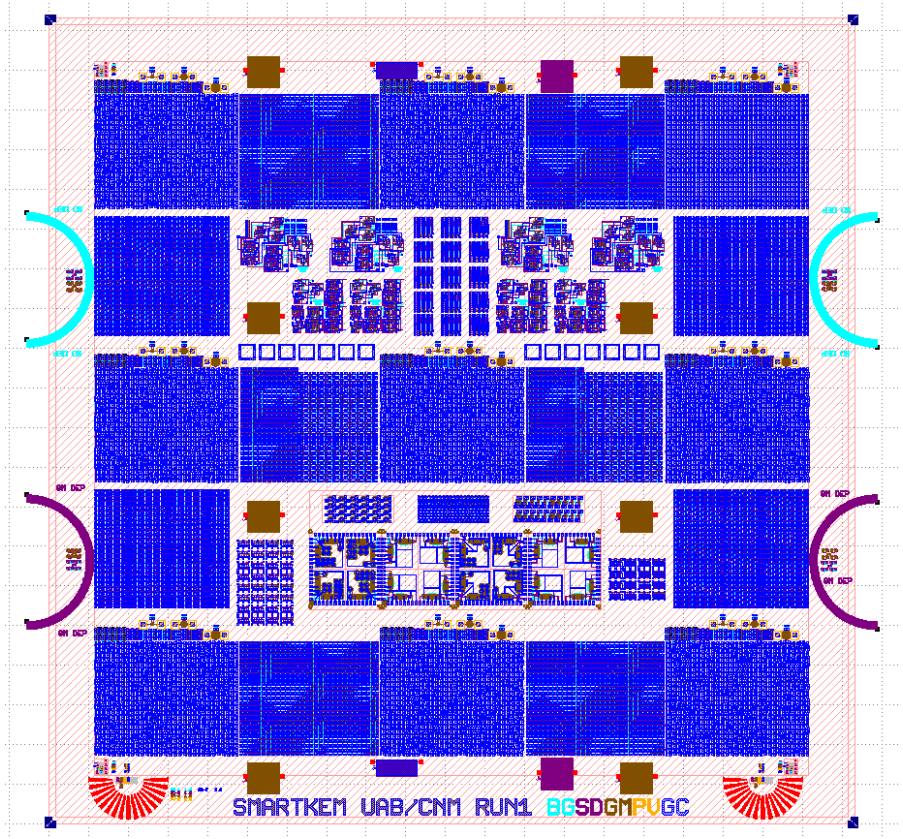


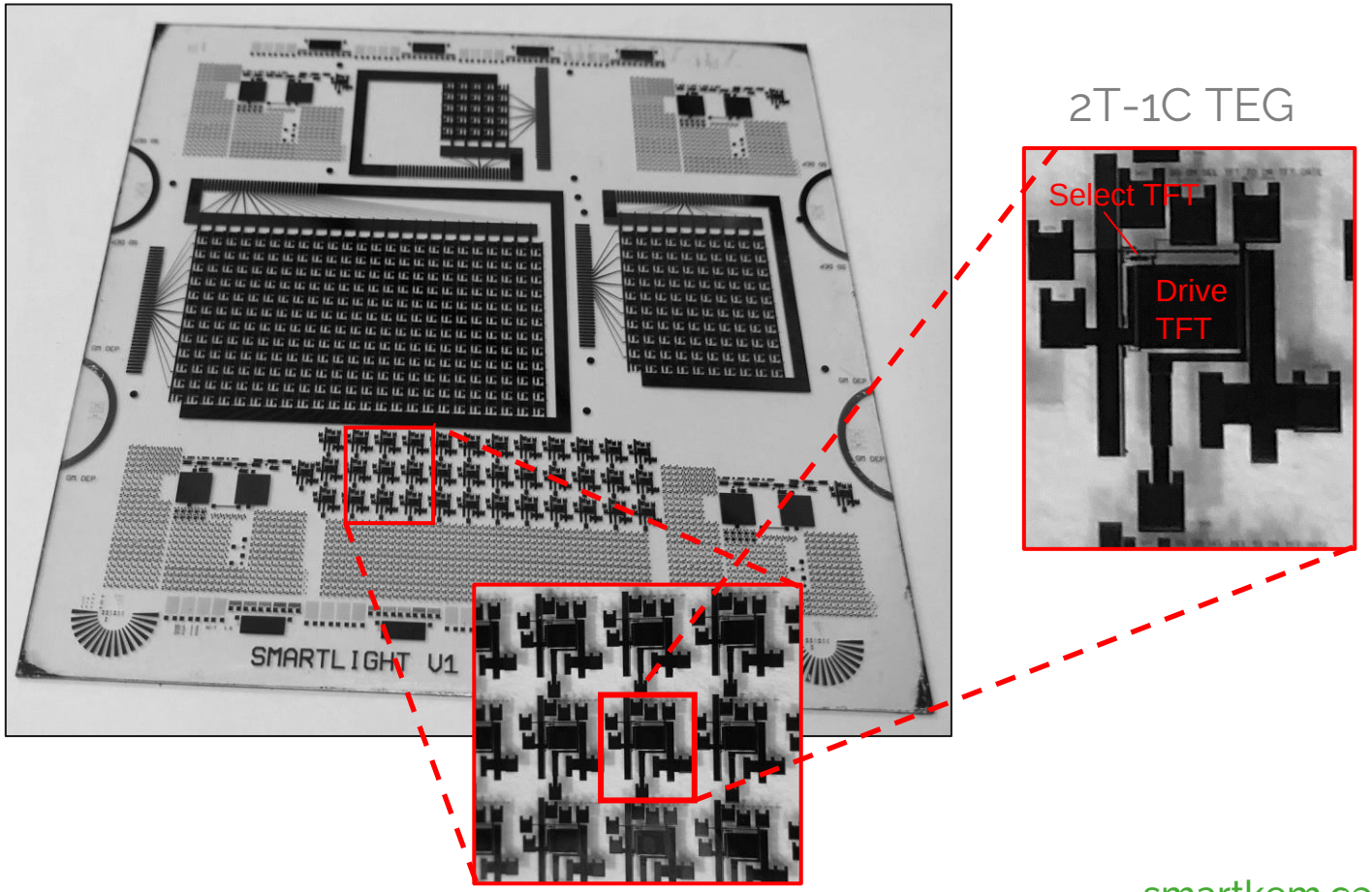
Pseudo CMOS is predicted to achieve similar yield to CMOS in larger circuits



Electrical Performance of **TRUFLEX® OTFT Array**

- 40mA median on current, V_d = -4,V V_g = -50V
- Off current is a few pA
- On/off ratio is ~10^{10}





SmartKem's **Transistor Platform**

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Thank You

Questions?

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