



Introducing SmartKem TRUFLEX[®]

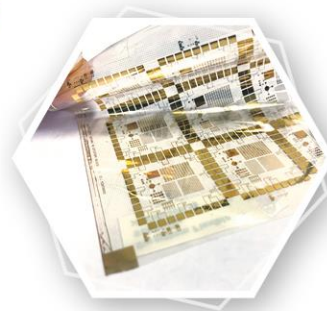
Enabling flexible electronics

03/08/2021

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Forward Looking Statements



This presentation contains forward-looking statements about SmartKem Ltd. 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 Ltd.

Executive Summary

Enabling flexible display 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
- Investors; Octopus Ventures, Entrepreneurs Fund LP, BASF Ventures

World Class Technology Team

- 38 (14 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 & X-Ray Sensors
- Launched first demonstrator at SID 2020

Company Overview

Enabling today's flexible electronics

- ⬡ Founded in 2009
- ⬡ Employees: 38 FTEs including 14 PhDs
- ⬡ Funding to date: \$37M
- ⬡ 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



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.

Significant Market Opportunities



\$186.68 Bn Global Display Market 8% CAGR
driven by demand for consumer electronics

Smartphones



Automotive



Flexible

Bendable

Wearable

Lightweight



Coloured
e-reader
tablets



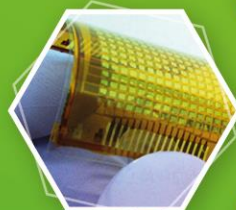
Flat Panel Displays



E-Paper Displays

\$151 Bn Sensor Market 6% CAGR
driven by IoT and wearables

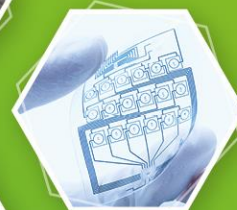
Wearables



E-Skin
Technology
Developments



Fingerprint Sensors



Printed
Biosensors

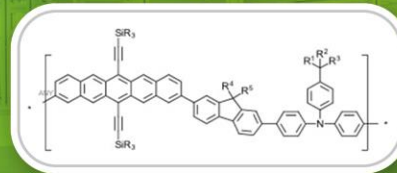
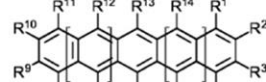
Convergence For **Mass Deployment** Success



1. TRUFLEX® Inks – Ready at Scale



Components of TRUFLEX® Inks



High Mobility, Small Molecule



Semiconducting Polymer 'Controls'



Solvents

- Hexagon icon Intrinsic mobility $\geq 20 \text{ cm}^2/\text{Vs}$
- Hexagon icon Technical team has excellent understanding of formulations
- Hexagon icon In-depth knowledge of how to combine small molecule/polymer/additives to maximise the performance of OSC layer and resulting oTFT
- Hexagon icon More than 50 years expertise relating to OSC formulation

- Hexagon icon Morphology of OSC layer
- Hexagon icon Phase segregation & uniformity of SM
- Hexagon icon Viscosity of ink

- Hexagon icon Best in class performance
- Hexagon icon Compatible with existing industrial process lines
- Hexagon icon Scaled up manufacture

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

2. TRUFLEX® Electrical Design Automation Tools

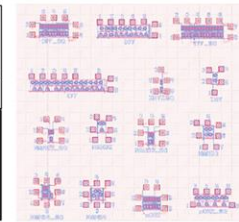
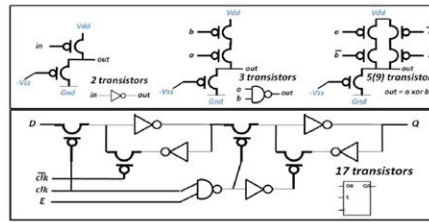
– In Beta Development



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 plate length / 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



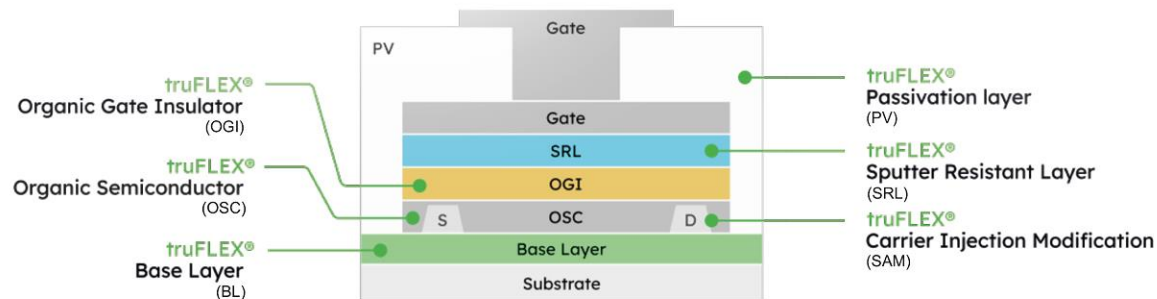
Digital
Lithography



SmartKem Technology Advantage



Leader in the **design, development,** scale up and manufacture of **solution-deposited organic semiconductors** for transistor backplanes



Ease of Technology Transfer

Chemistry, process and stack owned

Ideal for today's flexible displays

Formed on low-cost glass & plastic

Drop in technology for today's fab lines

(and ready for next gen)

World leading electronic performance

Meets industry critical test standards

Outperforms competitive materials a-Si, IGZO & LTPS

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

SmartKem OSC Outperforms Other World Class Players



Parameter	SmartKem	SAES (Flexterra)	Nippon Kayaku	BASF (CLAP Company, Kr)	Merck (Flexenable)	Sumitomo
OSC Chemistry	p-type polycrystalline small molecule + matched semiconducting oligomer (Mw 4000-10,000 Da)	n-type small molecule	p-type polycrystalline small molecule	p-type high molecular weight polymer Mw ~100,000-500,000 Da)	p-type high molecular weight polymer Mw ~500,000 Da)	p-type high molecular weight polymer Mw ~500,000-1000,000 Da)
Champion charge mobility (R&D laboratory, L=4μm)	6 cm ² /Vs	~2cm ² /Vs	~2 cm ² /Vs	<1cm ² /Vs	<1cm ² /Vs	~0.01cm ² /Vs
Charge mobility (Display Pixel, L=3.5μm)	3 cm ² /Vs	~1 cm ² /Vs	~1 cm ² /Vs	<1cm ² /Vs	<1cm ² /Vs	0.1cm ² /Vs
Process temperature (o C)	80	~120-150	~120-150	~120-150	~120-150	~120-150
OSC uniformity (Substrate size ≥Gen 2)	Excellent	Poor	Poor	Good	Good	Good
Printability	V. Good -Excellent	Poor	Poor	Good	Good	Good
Thermal Bias stress stability (60oC, 1h, 60%RH)	Excellent	Average	Average	Poor	Poor	Poor
Device stability (Hysteresis)	Excellent	Average	Average	Poor	Poor	Poor
OSC Compatibility with non-Gold S/D Electrodes	Good	Average	Poor	Poor	Poor	Poor
Batch to batch repeatability of scaled-up OSC chemistry	Excellent	Excellent	Excellent	Poor	Poor	Poor
Ease & cost of OSC purification (<ppb levels of impurities)	Excellent	Excellent	Good	Poor	Poor	Poor

Market Entry Strategy



1

**TRUFLEX®
Organic
INKS**

2

**TRUFLEX®
Design
Tools**

3

**TRUFLEX®
Foundry
Services**

Business Model

⬡ UDC (OLED)

Target Customers

⬡ Samsung, LG,
AUO, BOE,
Innolux etc.

Business Model

⬡ Synopsys (SNPS)
⬡ Cadence (CDNS)

Target Customers

⬡ Samsung, LG,
AUO, BOE,
Innolux, Dolby,
Apple, Sony etc.

Business Model

⬡ TSMC (TSM:US)

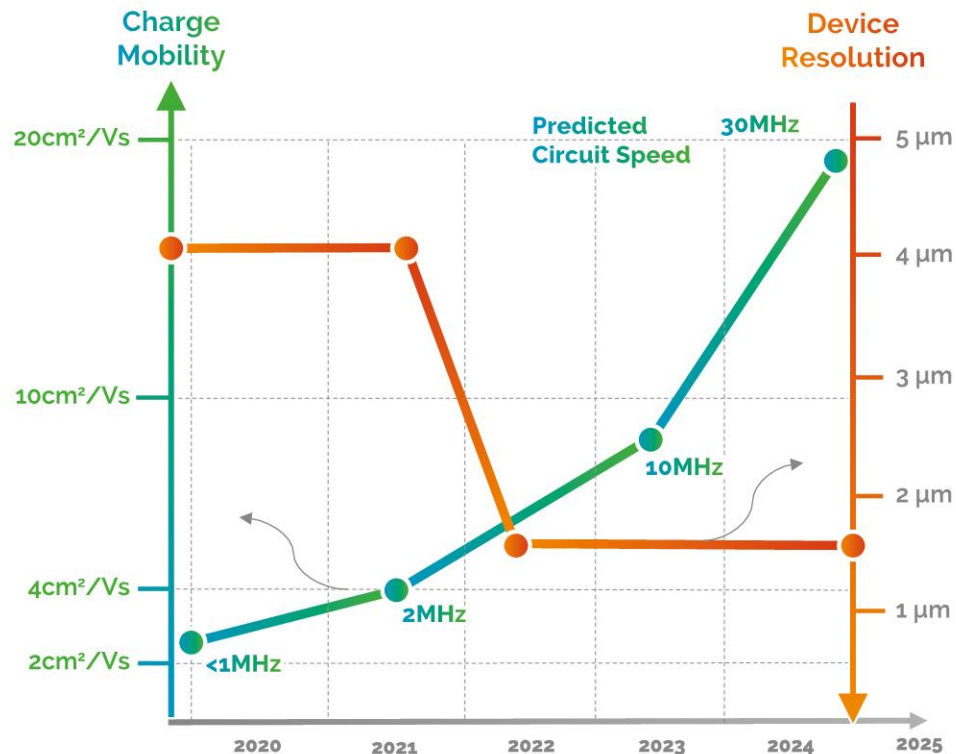
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SmartKem Core Chemistry Technology Roadmap



Smaller
Cheaper
Faster



SmartKem Process Improvement Roadmap

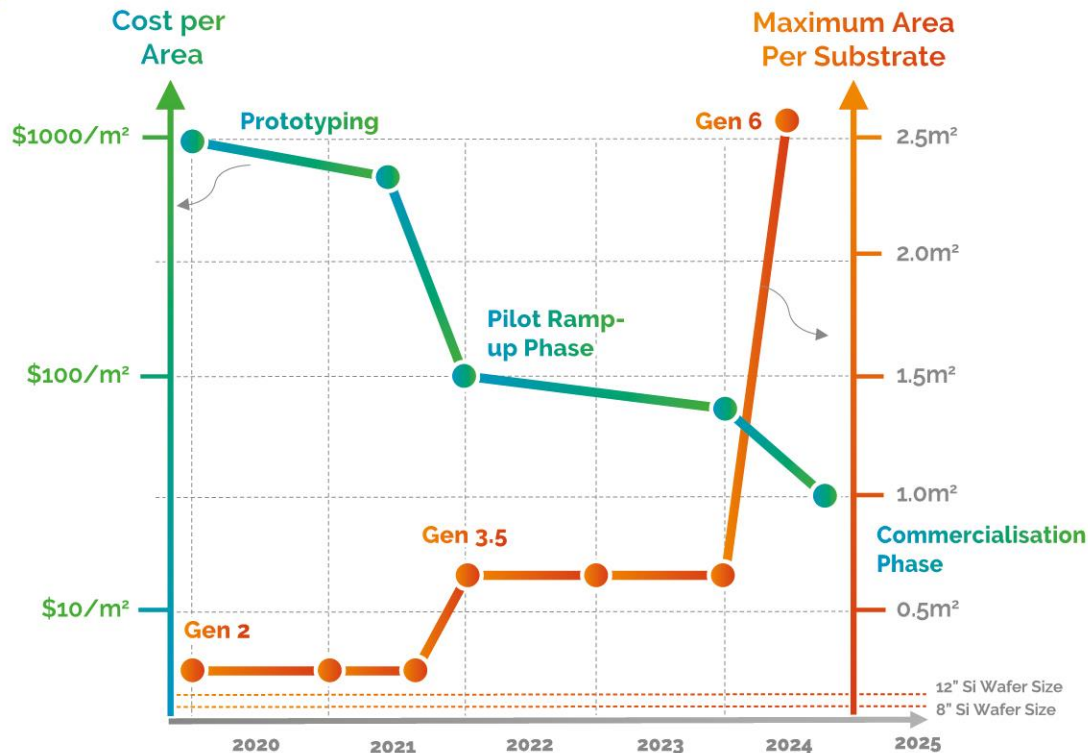


SmartKem is enabling designers to design, prototype & deploy innovation at a fraction of the cost of Silicon

⬡ Silicon optimized for processors

⬡ Silicon Cost (R&D) = \$25M/m²

⬡ Silicon Cost (Volume Manufacturing) = \$50K/m²



Outstanding IP and Know-How



Core IP Strength

1

Claim:

Broad range of
Formulations (Binders/
Small Molecules) Mixed
solvents & additives

2

Claim:

Small molecule(s)
OSCs + mixtures of small
molecules/ binders,
including wide range
of substituents

Over-arching IP Protection

3

Claim:

Devices and
applications

4

Claim:

Coating and
deposition methods

- ⬡ >160 patents across 16 patent families – 104 granted and >55 pending
- ⬡ 30 codified company trade secrets files and increasing...
- ⬡ Strong Freedom To Operate position and no 3rd party licenses required

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Thank You

Questions?

For more information, contact us

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