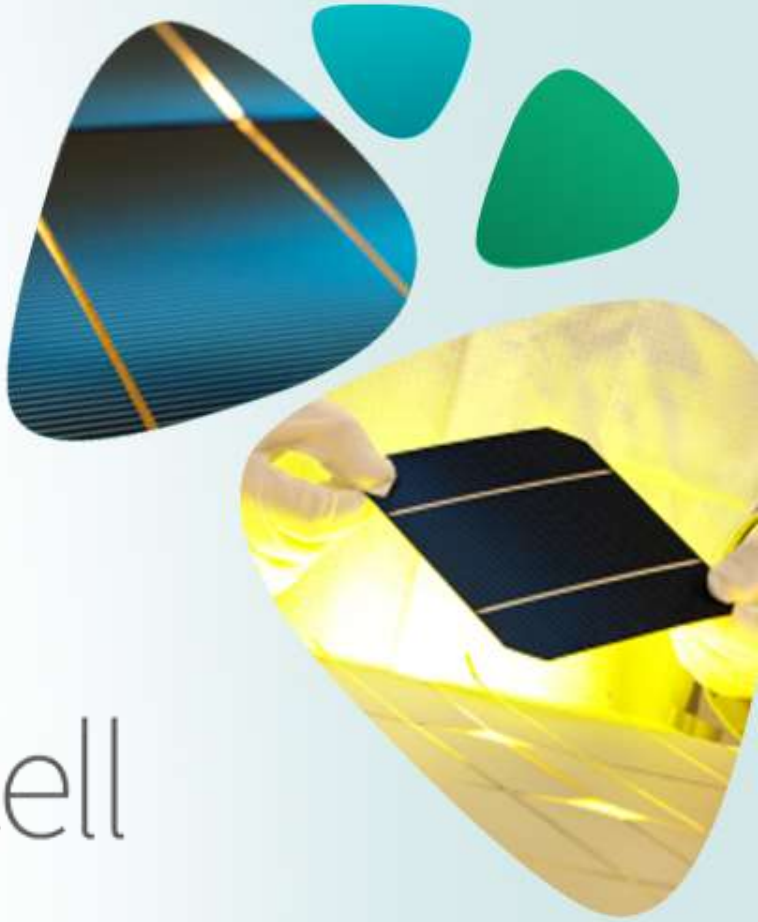


pvnanocell

Dr. Fernando de la Vega
CEO

April 2018

Sicrys™ Game Changer in Electronics

pvnanocell

Digitally Printed Electronics in Mass Production

Safe Harbor

This presentation contains forward-looking statements. All statements other than statements of historical fact contained in this presentation are forward-looking statements. In some cases, you can identify forward-looking statements by words such as "believe," "continue," "estimate," "anticipate", "expect," "intend," "plan," "potential," "project," "seek," "will," as well as the negative of these words or other comparable terminology. These forward- looking statements include, but are not limited to, statements about: the potential market opportunities for commercializing our current and planned products; our expectations regarding the potential market size for our current and planned products; estimates of our expenses, future revenue, capital requirements, and our needs for additional financing; our ability to develop and advance our current and planned products; the implementation of our business model and strategic plans for our business and products; our ability to maintain and establish collaborations or obtain additional funding; our financial performance; and developments and projections relating to our competitors and our industry. These statements reflect our current views with respect to future events or to our future financial performance and involve known and unknown risks, uncertainties, and other factors that may cause our actual results, performance, or achievements to be materially different from any future results, performance, or achievements expressed or implied by these forward-looking statements. Factors that may cause actual results to differ materially from current expectations include, among other things, those listed under "Risk Factors" in the Registration Statement on form F-1 (Registration No.: 333-206723) filed with the U.S. Securities and Exchange Commission on September 22nd, 2015 by the Company,

and subsequent 20F forms filed on 2016 and 2017. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

A New Era of Electronics

PV Nano Cell (PVN) enabling Digital Printing in circuitry manufacturing

In the early 1990's Digital Printing (Ink Jet) revolutionized the Graphic Arts Industry

a $188b market today!

Can we imagine life

<u>WITHOUT</u> digital printing - inkjet printers?

A New Era of Electronics

PV Nano Cell (PVN) enabling Digital Printing in circuitry manufacturing

The Next Digital Revolution is Here! 2018'th

PV Nano Cell **Sicrys™ inks enabling**

Digital Mass Production Printing in electronics.

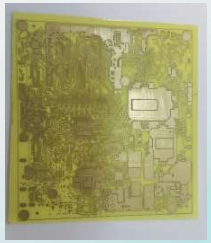
An additive mass production manufacturing process.

PVN Sicrys™ Inks

Digital Inkjet Printer

Cell Phone Antenna

PCB



Additive Digital Manufacturing

Impact example

20 years after same production technologies

PVN Sicrys™ inks enable NEW ELECTRONICS

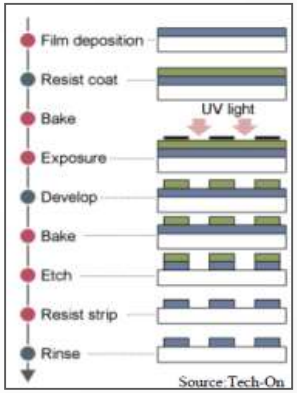
- Flexible electronics
- Customized electronics
- Thinner and denser electronics
- Cheaper and cleaner production
- New electronics

Manufacturing Electronic Devices - Today

Analog Technologies - Long Expensive Setup and limited performance:

- **Etching - Photolithography**
  - Multi step process.
  - Hazardous wastes.
  - Expensive capex.
  - Substrate limited.

Photolithography



- **Screen Printing**
  - Contact printing.
  - Expensive.
  - Substrate limited.

Screen Printing

Additive Digital Manufacturing Challenges

Key Problems Identified:

– Conductive inks

- Inks are not compatible with mass production process (stability and throughput).
- Inks are expensive.
- No commercially viable copper ink available.
  - Companies investing in the space include NovaCentrix, Harima, ANP, InTek

– Mass production printers & process

- No digital high throughput printers available.
- High entrance barrier for customers to develop process.

Market Opportunity - TAM

A printer is only as good as the ink put into it!

TAM – high growing markets Total > $100B (estimated)

Market	US$B market in 2022	Comments
PCB	73	Fully printed
PCB	6	Only conductive patterns
Embedded passive components	20	Capacitors and resistors
IoT (antennas)	0.5	Only metal printing
Photo voltaics	3	Only metal printing
3D Printing	unknown	

PVN's Solution: Sicrys™ Inks

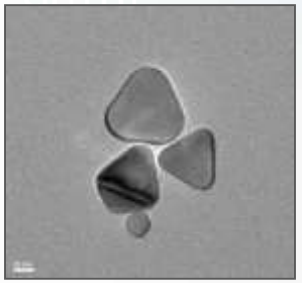
- Sicrys™ a platform technology mass production enabler

single crystal Nano metal particles inks

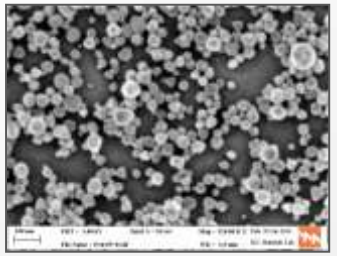
- 30 – 80 nm (D50) nano particles.
- Silver and Copper.

- Lower cost advantage.
- Higher stability & shelf life.
- Robust printing.
- High throughputs.
- Enhanced properties (electrical, adhesion).

Copper Nano Particles



Silver Nano Particles



Sicrys™ ink

Copper versus Silver – Low Costs

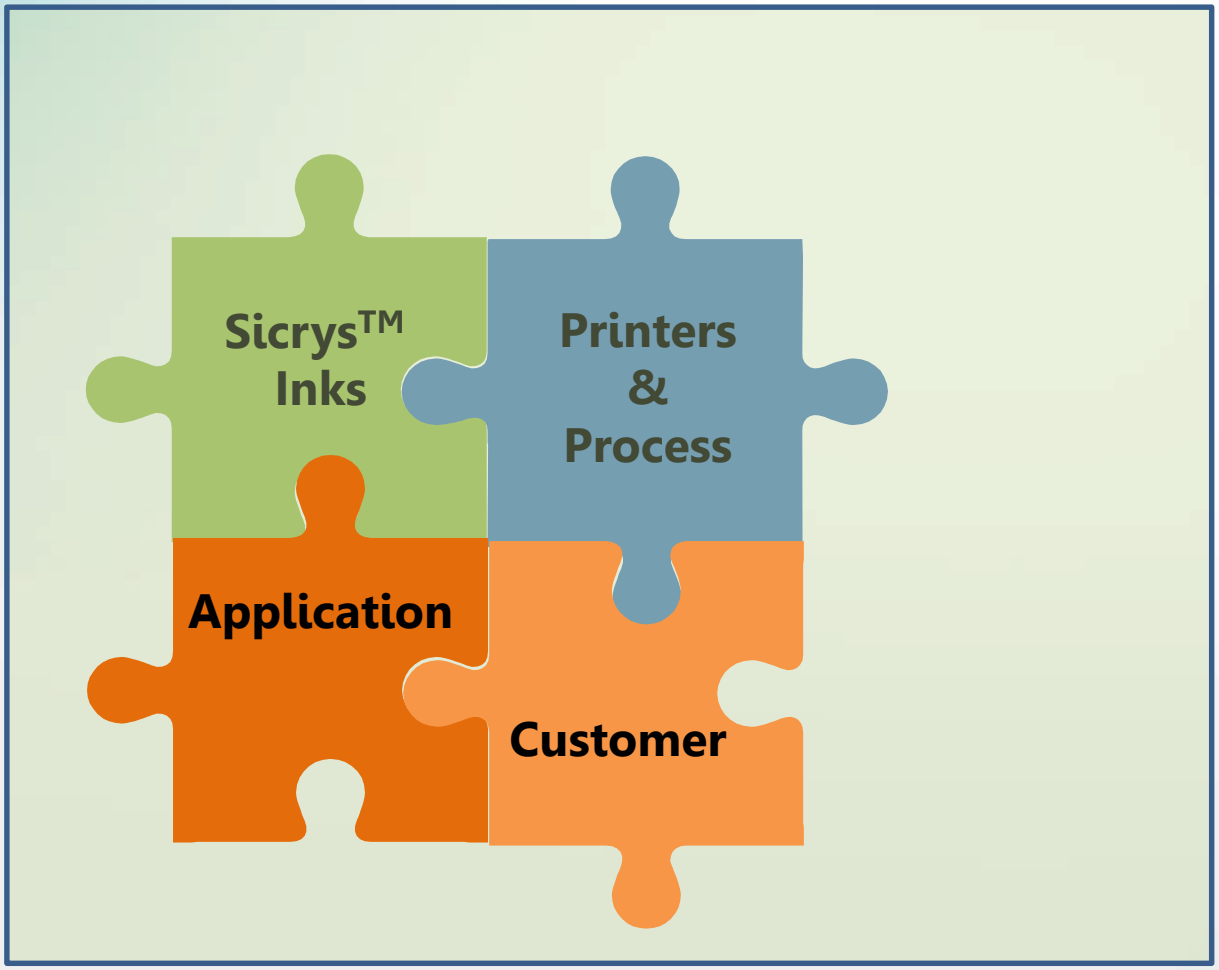
A must for mass production

- **Silver Inks** – most common metal for conductive inks.
- **Copper Inks** - High barrier to make.

Integrated Business Model

to solve high entrance barrier

PVN Complete Solution Approach



Sicrys™ conductive inks and Dielectric inks

PVN & Printer producers

PVN "razor/razorblade" printers, equipment and process

DigiFlex/PVN Integrated Prototype, Design R&D printers Printed Electronics dedicated.

PVN Provides the Complete Solution
from Design to Mass Production

DigiFlex

pvnanocell

orbotech Be Sure

NOTION SYSTEMS

PiXDRO

OPTOMEC

- Integrated **Prototyping, Design and R&D Printer**

Dedicated to Printed electronics

- **Conductive Inks**
- **Silver & Copper**
- **Soon dielectric, other inks**

- **Mass Production Printer Solutions**

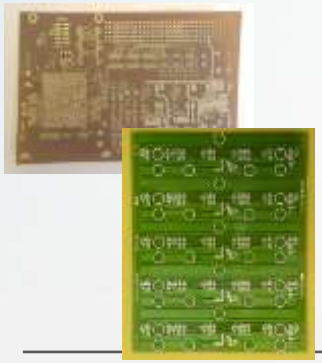
- Unique “one shop” printers for multi layer/multi ink
- High accuracy.
- Dielectric and insulator inks, soon.
- Competitive affordable prices.

Sicrys™ Inks are working

Mass production applications (beta sites):

Printed Electronics

- Flexible and customized electronics
- Printed Circuit Boards (PCB)



CPC Solutions

Printers from

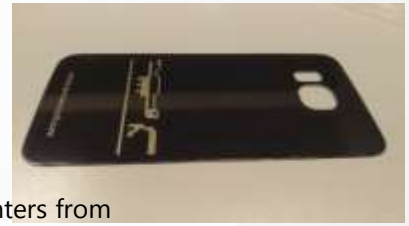
orbotech Be Sure

DigiFlex

IoT / IoE

Printing for mobile phones

- Antenna –
- Touch screens



Printers from

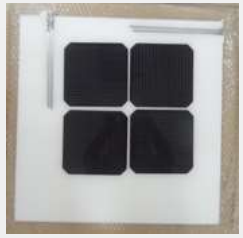
OPTOMEC

Production Grade 3D Printers... with a Material Difference

LITEON

CleanTech

Photovoltaic (PV) metallization



Printers from

MEYER BURGER

PiXDRO

3D Printing

stratasys

Sicrys™ Inks are working

Supply agreements:

~ $700,000 for 2018-2019.

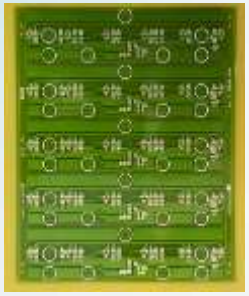
up to ~ $ 2.5M by end of 2019.

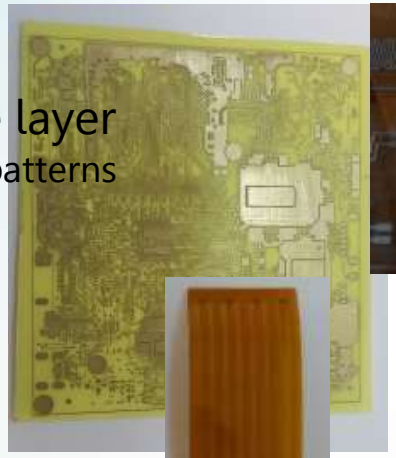
first razor/razorblade printer installed.

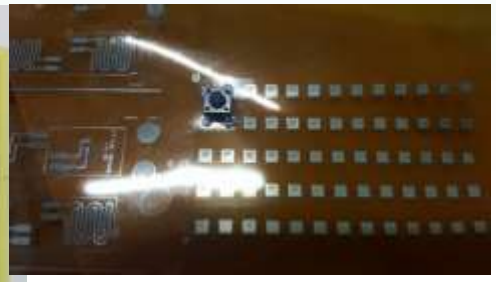
Additional in the pipe line….

Sicrys™ Inks are working

PCB & One layer
70 µm width patterns

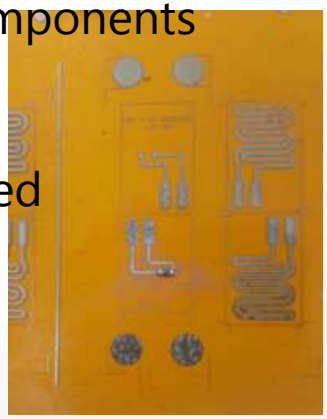




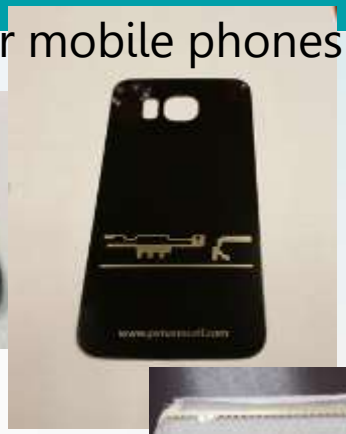


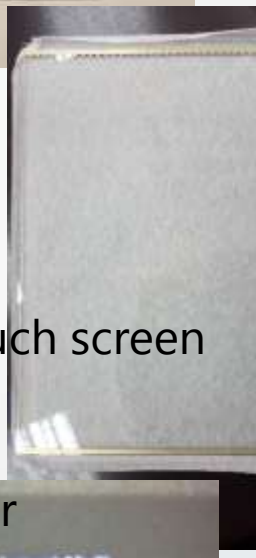
SMT soldered components

4 layer PCB,
inner layers printed



Antennas for mobile phones



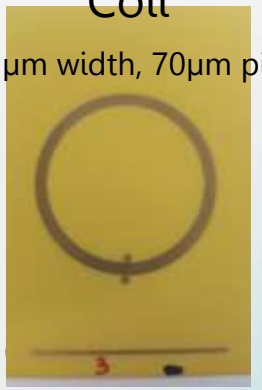


Touch screen

Photovoltaics

Coil

(70 µm width, 70µm pitch)



Capacitor

Management Team & PVN

Dr. Fernando de la Vega
Founder, CEO & Director

- Entrepreneur with more than 30 years industrial management experience.
- PhD in Applied Chemistry from The Hebrew University.
- General Manager, R&D and Operations Manager at Cima NanoTech.
- Developed Nanotechnologies infrastructure in the Israeli Chemical Industry with $30M budget as Chairman of the NFM consortium.
- Operations VP, R&D and QA Manager at Tosaf Compounds.
- R&D and Lab Manager at Chemada.
- Consultant work, created R&D consortiums, > 10 publications & > 10 patents and patent applications.

Eyal Shpilberg
COO

- Over 30 years industrial experience, CEO of technology based companies and Corporate Vice President Consumables Division, of Creo Ltd. (Israel and Canada).
- Experience marketing & business development executive, defining and executing vision and business strategy,
- Expert in leading business development processes, marketing and sales in global markets, leading business negotiation processes though conclusion of transactions.
- Experience in team building, recruiting professional staff members and driving teams towards goals, setting protocols and work processes.
- Extensive technical multi-disciplinary background – physics, software, hardware, materials, biology, chemistry, diagnostics.
- B.Sc. in Mechanical Engineering, Dean's Honors List and BA in Computer Science, Dean's Honors List from The Technion Institute of Technology

PVN created end of 2009.
High quality team – 20 members.
Inks and printers production.
Two places in Israel.

Evyatar Cohen
CFO

B.A. in Business Management (2000) and was awarded his Master of Law degree from Bar-Ilan university (2003).
Evyatar also worked in the PwC New York branch for five years as an audit manager.
Evyatar is a licensed certified public accountant in both the US and in Israel and a member of the AICPA and the Institute of Certified Public Accountants in the US and Israel respectively.

Competitive Landscape

Some competitors:

Novacentrix (USA) – water based silver inks, up to 40% metal, not stable, expensive, Copper ink is a precursor ink (not copper metal), only for their Force pulse sintering method, not suitable for thick patterns.

Advanced Nano Products (Korea) - very small particles, 30-35% metal, higher sintering temperatures (250°C; 450 °C). Expensive.

InkTec Korea) - smaller particles, most with precursor, expensive. Up to 40% metal, sintering temperatures (130-350 ° C), low thickness < 1.5 µm only.

Intrinsiq (UK) -Metal evaporation technology, high cost. Selling nano copper and nano silver dispersions. Good quality, VERY expensive.

Ulvac & Harima Kasei (Japan) - Very small particles ~ 4 nm, toluene or tetradecane or similar solvents – (not suitable for mass production printing), low metal (20%).

Dupont – Nano silver inks, not stable need cooling (< 5 °C, shelf life 3 months), inks sedimentate, up to 45% metal, low thickness compatible, Resistivity's around 13 µΩcm at 130 °C.

Nanodimention (Israel) – unknown quality, low metal content, used for their printers, $10,000 per kg.

Copprint (Israel) – new player startup. Claims to have copper pastes (high viscosity). Sintering done by heating and applying pressure (not suitable for mass production). No data on stability or pricing.

Competitive Landscape, Sicrys™ Advantages

- Competitive with screen printing pastes.
- 24/7 printing, high throughput compatible.
- Greater stability – over 1 year.
- Enhanced electrical and printing properties.
- Unique products.
- Sicrys™ production process – 2 t/year (20 t/year):
  - Scaled up (Low cost equipment & process).
  - Efficient and green.

PV Nano Cell Sicrys™ inks / DigiFlex printers:

- Unique "one shop" provider of printers for multi layer/multi ink digital printing electronics.
- Dielectric and insulator inks, soon.
- Competitive affordable prices.

Benchmark:

Nanodimension (NASDAQ:NNDM)

- A few beta sites printers.
- Silver ink~ $10,000 /kg – no copper ink.
- Expensive printer, low throughput

Intellectual Property

- Patents **granted** in:
  - USA (9,556,350),
  - Russia (RU 2593311),
  - China (CN 103282969)
  - Japan (JP 6067573).

- Copper WO PCT/1B2015/051536 (WO2015132719) – National phase.
- Silver WO PCT/US2011/063459 (WO2012078590) – National phase.

- PVN joint patent submitted with TAU: IP Nano wires for thin solar cells metallization: WO 2013/128458; US 9,373,515 B2 Conductive Nanowires Films.
- PVN IP general (sono chemistry – nano materials – owned by subsidiary NZE): USA 7,157,058; USA 7,504,075; IL 144638; IL 149932.

Resources:
Copper - https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2015132719
Silver - https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2012078590; http://bit.ly/2lsNEnl

Summary

- **2018 Commercial quantities revenues.**
- Focus in **The Digital Revolution in Mass Production of electronics.**
- **Developed high tech Nano technology**, "green", cost efficient, proven scalability.
- Proprietary, Patented (**PVN owned IP**), **Unique products**: solar cells and copper inks.
- **Experienced** Management Team.
- Developed a **"Complete Solution"** approach – customers oriented and focused.
- Serving **>$100B growing markets** and additional market opportunities available for the future.
- Started **commercialization**.
- **OTCQB:** PVNNF

Thank you!

Join us to make a difference in the world!

For more information, please contact:
fernando@pvnanocell.com

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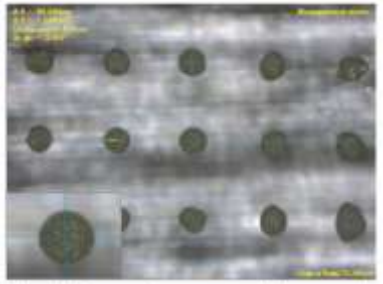
http://www.pvnanocell.com/
Phone: +972-4-6546881
Fax: +972-4-6546880

Study on Sicrys™ Silver Inks: Fujifilm

Jet-ability and Drop Formation tuning:
The waveform was based on the Dimatix Model Fluid and modified to optimize drop speed and formation. A cancellation pulse was used to keep the ligaments straight while exiting the nozzle. Drop speed was adjusted to 5 meters per second to match the print head to substrate distance. The nozzles jetted the fluid consistently and reliably with a long open time. Leaving the print head in the printer over the weekend was able to jet after a 0.8 second purge and all 16 nozzles fired. This is very good for reliability in a production environment.



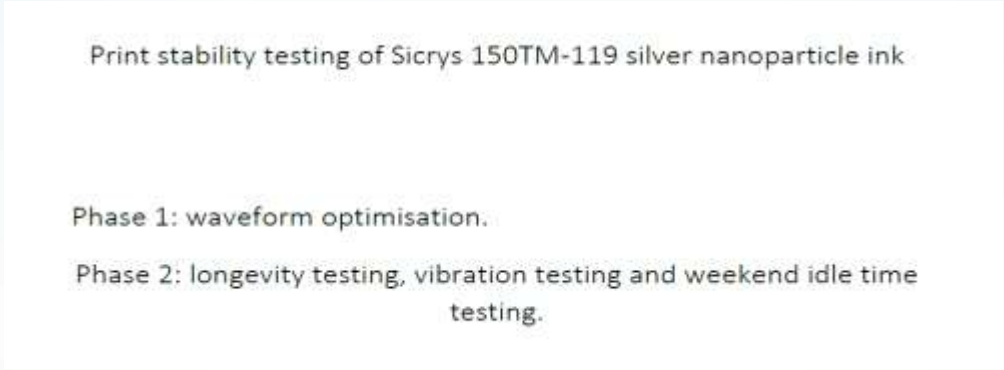
Summary of Results:
The PV Nanocell I50T-1 Silver Nanoparticle fluid jets well. The waveform was based from the Dimatix Model Fluid waveform with minor modifications. A single pulse waveform was created for this test. Test patterns were jetted onto standard glass slides. On initial inspection the typical "coffee ring" effect was not noticed. The coffee ring effect is where the fluid has a tendency to pool at the outer edges leaving a lower depression in the center of the pattern. This is the first silver fluid we have seen which does not exhibit this phenomenon. The jetting was consistent and all nozzles jetted even after leaving the print head and cartridge in the printer over night.

Print Results:
Using plain glass slides as a test substrate, the drop diameter was measured at an average of 52 microns. When using UV Ozone to treat the glass slide surface, an average drop diameter was measured at 80 microns. For large fills, the fluid cured flat and did not show typical coffee ring effects. With our standard 25 mm long line with a width of 1mm test print, we measured conductivity on 1.5 Ohms. This is very good and the lowest we have seen with silvers on glass with this image file. Typical measurements fall between 25 to 30 Ohms for other silvers.

FUJIFILM Dimatix

pvnanocell

Study on Sicrys™ Silver Inks: M-SOLV



The printing stability of PV Nano Cell Sicrys™ I50TM-119 silver nanoparticle ink was determined by printing continuously for 17 hours a day for a total period of 4 days and checking test prints at regular intervals. Also a "vibration test" was performed using repeated X stage movements to investigate whether printing is affected by air bubble formation and/or nozzle drying at air flow. Printing was performed with KM1024SHB print head, frequency was set up to 15kHz with one print every 6 seconds. Head maintenance every 30 minutes.

Summary

- Overall, results are very good for all tests performed: longevity testing (printing test and weekend idle test) and vibration testing. Collected data indicated that in all cases jetting straightness was stable. Nozzle plate for printing test and vibration test stayed dry for all the time.
- Wave form and maintenance cycles were optimized.