**Docket #:** S11-192

# Microfluidic Arrays for Rapid Characterization of Organic Thin Film Transistor Performance

Stanford University and Samsung researchers have patented a microfluidic-based platform that can rapidly fabricate and characterize Organic Thin Film Transistor (OTFT) arrays composed of solution-processable organic semiconducting polymers. Microfluidics offers numerous advantages for this high-throughput screening of OTFTs including the ability to:

1) rapidly handle and interface multiple solutions;
2) pattern solutes on substrates with micrometer-scale precision; and
3) reduce the scale of experimentation.

This method has been successfully tested to screen the performance of OTFT devices fabricated from PQTBTz-C12, a solution processable organic semi-conducting polymer, to extract empirical processing-property relationships and identify the optimal combination of solvent composition and substrate annealing temperature.

**Stage of Development:**
**Proof-of-concept** – Successfully applied platform to screen performance of OTFT devices fabricated from PQTBTz-C12 to extract empirical processing-property relationships and identify the optimal combination of solvent composition and substrate annealing temperature.

## Applications

- Organic Thin Film Transistors (OTFTs) for light-emitting diodes (LED), radiofrequency devices, digital displays, photovoltaics, and sensors.
- Automated, fast screening technology for life sciences.

## Advantages

- Precise microfluidic-based platform reduces scale of experimentation.
- Rapid fabrication and characterization.
- More uniform processing for more consistent, high-performance devices.

## Publications


- Bettinger, C. J., Becerril, H. A., Kim, D. H., Lee, B. L., Lee, S., & Bao, Z. (2011). Microfluidic Arrays for Rapid Characterization of Organic Thin-Film Transistor Performance. *Advanced Materials, 23*(10), 1257-1261. https://doi.org/10.1002/adma.201003815
- Chung, J. W., Bettinger, C. J., Bao, Z., Kim, D. H., Lee, B. L., Park, J. I., ... & Lee, S. Y. (2014). *U.S. Patent No. 8,679,984*. Washington, DC: U.S. Patent and Trademark Office.


## Patents

- Published Application: 20130001554
- Issued: 8,679,984 (USA)

## Innovators

- Zhenan Bao
- Christopher Bettinger
- Jong Won Chung
- Do Hwan Kim
- BangLin Lee
- Jeong il Park
- YongWan Jin

## Licensing Contact

**Evan Elder**

Associate Director, Licensing and Strategic Alliances, Physica

Email