



Imprint Lithography for Flexible Electronics (20140098, Dr. Daniel Frisbie)

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Category

Engineering & Physical
Sciences/Materials

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Flexible Electronics Fabrication Limitations

Flexible electronics fabrication technology creates circuits on substrates like plastic. However, most advances in flexible electronics manufacturing have focused on mechanical transfer of conventionally fabricated circuits using lithography from an initial substrate onto a flexible one. Such “pick and place” manufacturing systems may face limitations in scaling. In order to bring more flexible electronic based products to market, it is necessary to develop a way of quickly manufacturing cost-effective flexible electronics with high throughput.

Lithography Technique uses Microchannels

A new fabrication process, Self-Aligned Capillarity-Assisted Lithography for Electronics, is a flexible electronics manufacturing process in which microchannels and reservoirs are molded and coated in thermoset material by imprint lithography. Electronic inks are delivered into the reservoirs which fill relief patterns in the thermoset to create stacked layers of the electronic circuit. This new manufacturing platform can create fast, low-power circuits in rubbers, plastics, paper, and metal foil. Entire electronic systems can be manufactured in this way, representing an advancement in flexible electronics fabrication.

BENEFITS AND FEATURES OF SELF-ALIGNED CAPILLARITY-ASSISTED LITHOGRAPHY FOR ELECTRONICS:

- Self-aligned - multiple inks can be delivered sequentially to prefabricated cavities
- Multiple dispensers can be employed at once
- Resistors, capacitors, diodes and thin film transistors can be fabricated

Phase of Development Proof of Concept

Researchers

C. Daniel Frisbie, PhD

Distinguished McKnight University Professor, Chemical Engineering and Materials Science

[External Link](http://www.cems.umn.edu) (www.cems.umn.edu)

Lorraine F. Francis, PhD

Professor, Chemical Engineering and Materials Science

[External Link](http://www.cems.umn.edu) (www.cems.umn.edu)



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