

Self-Aligned Capillarity-Assisted Lithography for Electronics

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Continuous printing processes are attractive for manufacturing electronic devices on flexible substrates. Two challenges typically arise, however, in the use of traditional printing processes for electronic devices: creating small feature sizes, and achieving good registration of multiple functional layers. The Self-Aligned Capillarity-Assisted Lithography for Electronics (or SCALE) process addresses these challenges^{1,2}. SCALE involves imprinting a multilevel, recessed open network of reservoirs, capillaries and device structures into a curable coating deposited on a flexible substrate, delivering electronically functional inks into the reservoirs by inkjet printing and using capillarity to selectively fill features to create electronic components, devices and circuits. The single imprint step creates all the structural features needed in the devices and capillary flow creates self aligned, multimaterial devices. To-date we have used SCALE to create conductive networks, resistors, capacitors and thin film transistors. Feature sizes on the order of microns or less are obtained. The roll-to-roll implementation of the process will be discussed along with the fundamentals of key process steps.

References:

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