

Abstract Submitted
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Inkjet and Wax Printing: Low Cost Tools for High Throughput Sensors¹ MADISON WALTON, Southeast Missouri State University, MO-HTASHIM SHAMSI, AHMAD ZAMAN QAMAR, SENSEN CHEN, Southern Illinois University Carbondale — Inkjet and wax printing have recently become popular to fabricate devices for biosensing and bioanalytical applications due to need of low cost fabrication for resource limited regions of the world. Although inkjet and wax printing are commonly available technology, they have never been used in combination. We present here a rapid, low-cost and high throughput method to fabricate electrochemical sensors by combining inkjet and wax printing. Office-grade printers were used to print 96 electrochemical sensors per substrate in one hour for only \$0.03 per sensor. Electrochemical devices were printed on flexible polyethylene terephthalate (PET) substrate by using silver nanoparticle ink as a conductive layer and solid wax ink for a hydrophobic pattern as well as capping layer. Almost 96% of printed devices were found to be functional on a single substrate. Sensors of various sizes and shapes can be printed simultaneously on one substrate and can also be customized on demand using a graphic design software. Depending on detection need, the conductive layer can be easily modified by electrochemical deposition of certain metals. Flexibility of these sensors holds potential for mass production by roll-to-roll printing.

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