Printed Electronics: Innovations in Materials, Processes, and Devices

Vivek Subramanian
Electrical Engineering and Computer Sciences, University of California, Berkeley, CA

In recent years, there has been significant interest in the applications of printed electronics in the realization of a range of low-cost, large area, flexible electronic systems such as displays, distributed sensors, and low-cost disposable tags. To make printed electronics a viable technology, however, there is a need for significant innovations across all aspects of these systems, including realization of advanced printable materials, improvements in printing technology, and design and realization of devices and systems that exploit the capabilities of this emerging technology. In this talk, I will review our progress in advancing the state of the art in printed electronics. I will begin by discussing the physical underpinnings of printing and will discuss how understanding and control of printing-related phenomena allows for substantial advancement in the capabilities of the same. I will additionally discuss advances in printable material systems that enable the realization of high-performance printed thin films. In particular, I will discuss the importance of proper material design for use as printable precursors. Finally, I will show how the combination of advanced printed techniques with appropriate materials and proper device design may be used to realize printed devices with unprecedented performance levels, thus helping to usher in the era of printed electronics.

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