

Cambridge Elements

Elements of Flexible and Large-Area Electronics

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INTEGRATION TECHNIQUES FOR MICRO/ NANOSTRUCTURE-BASED LARGE-AREA ELECTRONICS

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Integration Techniques for Micro/ Nanostructure-Based Large-Area Electronics

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Abstract: Advanced nanostructured materials such as organic and inorganic micro/nanostructures are excellent building blocks for electronics, optoelectronics, sensing and photovoltaics because of their high crystallinity, long aspect ratio, high surface-to-volume ratio and low dimensionality. However, their assembly over large areas and integration in functional circuits is a matter of intensive investigation. This Element provides detailed descriptions of various technologies to realize micro/nanostructure-based large-area electronic (LAE) devices on rigid or flexible/stretchable substrates.

The first section of this Element provides an introduction to the state-of-the-art integration techniques used to fabricate LAE devices based on different kinds of micro/nanostructures. The second section describes inorganic and organic micro/nanostructures, including the most common and promising synthesis procedures. In the third section we explain different techniques that have great potential for integration of micro/nanostructures over large areas. Finally, the fourth section summarizes important remarks about LAE devices based on micro/nanostructures, and future directions.

Keywords: Large-Area Electronics, Printed Electronics, Nanotechnology, Nanostructures, Microstructures, Nanowires, Nanotubes

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