Advanced materials & devices concepts for plastic opto/electronics

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Abstract

Soluble semiconducting materials that can be processed using a wide range of scalable and inexpensive deposition techniques represent an emerging class of electronic materials that could potentially be used to manufacture a wide range of optoelectronic devices and systems. Due the relatively modest performance characteristics, however, the use of solution-processable semiconductors to date has been limited to conventional thin-film devices and relatively simple integrated systems. In the first part of my talk I will discuss the development of solution-processable semiconductors based on organic and inorganic compounds while in the second part I will describe the development and application of novel patterning methods for the manufacturing of large-area nano-scale devices onto arbitrary substrate materials. These new material concepts combined with our novel processing protocols could potentially pave the way towards hybrid electronics with performance characteristics well beyond current state-of-the-art devices based on conventional semiconductor technologies.