**Polymer films for flexible electronics**

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Flexible electronics are enabling a variety of emerging technologies including flexible displays, electronic paper, low-cost radio frequency identification tags and electronic textiles. The development of flexible electronics opens the possibility to new roll-to-roll manufacturing processes, which are anticipated to reduce costs relative to conventional semiconductor batch manufacturing and to allow the integration of electronics on very large area structures. To fully enable many of these new applications will require the development of a host of new thin film materials. This includes new organic and polymer-based conductors, dielectric materials and semiconductors which can be deposited as films using low temperature methods such as spin coating, casting and stencil printing. Active devices such as thin film transistors (TFTs) and passive components such as resistors and capacitors can be fabricated using novel organic and polymeric materials. We have investigated flexible carbon particle/polymer composite films as a replacement for conventional vacuum deposited gold ohmic contacts in TFTs. These composite films exhibit remarkable performance when used to fabricate thin film transistors (TFTs) with poly(3-hexylthiophene) as the active semiconducting layer. These composite contacts are stencil printed and cured at 100° C. Furthermore, the P3HT can be cast from a toluene solution, thereby enabling low-temperature processing. We have also investigated novel magnetic and dielectric films based on a similar composite approach.