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Scalable fabrication of nanostructured devices on flexible substrates using additive driven self-assembly and nanoimprint lithography

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Roll-to-roll (R2R) technologies provide routes for continuous production of flexible, nanostructured materials and devices with high throughput and low cost. We employ additive-driven self-assembly to produce well-ordered polymer/nanoparticle hybrid materials that can serve as active device layers, we use highly filled nanoparticle/polymer hybrids for applications that require tailored dielectric constant or refractive index, and we employ R2R nanoimprint lithography for device scale patterning. Specific examples include the fabrication of flexible floating gate memory and large area films for optical/EM management. Our newly constructed R2R processing facility includes a custom designed, precision R2R UV-assisted nanoimprint lithography (NIL) system and hybrid nanostructured materials coaters.