Integrated Fabrication of Polymeric Devices for Biological Applications

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A novel fabrication technique for all-polymeric, microfluidic bio-MEMS devices is presented. This device uses selective electrodeposition of a bio-polymer, chitosan, to successfully create an environment for complex biological experiments within an SU-8 microchannel. The surface energy between SU-8 and PDMS is measured to be 0.047 \pm 0.018 J/m\textsuperscript{2}, allowing for reversible encapsulation of the microfluidic channel. The conducting material, polypyrrole, has a conductivity of 47 \pm 5 S/cm and is explored as a replacement for metal electrodes in future work. It is the successful integration of these four polymers, however, that enables such versatile devices to be fabricated.

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