Integration of polymer nanopores in lab-on-chip systems for biochemical sensing

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Biological nanochannels regulate the ion and chemical transport across a biological cell membrane. These nanochannels are highly selective and sensitive, yet fragile and instable, which impede their application as a sensor. Ion-track etched membranes offer a valid alternative to biological cell membranes. Long-lasting biomimetic nanosensors are produced by modifying the nanopore geometry and surface properties. Techniques such as atomic layer deposition, sputtering and wet chemistry are used for this modification [1-2].

This work presents a microfluidic system with integrated polymer ion-track etched nanopore membrane. The microfluidic system consists of measuring electrodes, microfluidic channels and the ion-track etched membrane. To fabricate the microfluidic system gold electrodes where patterned on a borosilicate glass substrate. The microfluidic channels are then structured in a dry film epoxy photoresist (DJ MicroLaminates' SUEX). The ion-track etched membrane is thermally laminated between both microchannels using a solvent-free bonding process. This integration paves the way for a lab-on-chip system for various applications.

References

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