

Stable modification method for the fabrication of solvent resistance Poly (dimethylsiloxane) microfluidic devices with hybrid material

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We establish the stable modification method for fabricating solvent-resistant poly (dimethylsiloxane) microfluidic devices. PDMS microfluidic devices can be easily modified with HR4, a hybrid material. This modification remarkably increases the resistance of PDMS microfluidic channels to various solvents because it leads to a significant reduction in the rate of solvent absorption and consequent swelling. The compatibility of modified PDMS with a wide range of solvents was investigated by the evaluation of swelling ratios measured by changes of weight in standard blocks. We demonstrated the generation of organic solvent droplets with high monodispersity successfully in microfluidic devices without causing swelling problems. The proposed method will be useful for the fabrication of microfluidic devices or microreactors for organic reactions.