

Preparation of Multi-Dimensional Microchannel using Over-Exposure Photolithography with Hydrophilic Polymer and Its Application to DNA Separation

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We developed simple photolithography with UV overexposure for the fabrication of multi-dimensional microchannels by single process. The degree of overexposure is determined by the amount of UV dosage which is incident on the mask. However, the photoresist was under the shadow part of the photomask, which was partially cured by the scattering of UV light and diffusion of over generated radicals in the photoresist and formed narrow bottle neck structure. Moreover, hydrophilic polymer was coated inside the channel to be given hydrophilicity to make capillary flow. By these narrow parts through channel, hindrance effect made a difference of velocity of DNA which contained different base pair numbers. When the electric field was formed through the channel, small size of DNA was moved faster than that of heavier DNA. The series of inter-connected hemisphere structures are very useful for the separation of biomolecules owing hindrance effect, and mixing of reactants through the microchannel which has low Reynolds number.