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Abstract
This study use the glass for the substrate of the microchannel and use the Micro Elector Mechanical System (MEMS) technology to manufacture the microchannel on the glass substrate. Among the design of microchannel by glass substrate changes the dimension and shape by geometry to define the region of hydrophilic and hydrophobic for making the microfluid flow or stop in the microchannel. When the sample fluid is injected into the nicrochannel, the sample will flow smoothly in the region of hydrophilic and the geometry dimension of the microchannel, then the microfluid may be stop in the region of hydrophobic the sample can produce advance or stop switch of microfluidic valves in the microchannel. The effect of surface tension and gravity make the stop microfluid to overcome the surface tension of hydrophobic regions. Then use the anodic bonding technology to bond the glass and silicon chip for the microchannel. Before the experiment, we use the computational fluid dynamics software to simulate and analyze the flow behavior of surface tension in the microchannel with the different geometry dimension and compare the result of experiment and simulation finally. The concept of design stand on the change of geometry and dimension in microchannel to control the microfluidic flow or stop in the microchannel. And driving the microfluidic by surface tension and gravity, this is a tendency driven the microfluidic, it is applied to the mult-funtion sampling of biomedical detection and can integrate other microfluidic system in the future.
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