Sorting in microfluidic device using bilayer microvalve

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Sorting is applied widely in various areas with high performance which demands a large number of micro droplets or particles such as clinical diagnostics, infectious disease research, and environmental assessments. In traditional Fluorescence-activated cell sorting (FACS) has several weaknesses: biohazardous aerosol formation, contamination between samples, and costly equipment. Our novel sorting platform can overcome these weaknesses.

We designed a microfluidic sorting with bilayer microvalves for sorting the desired droplets or particles. The sorter consists of a detection point and a sorting part. Before being sorted, laser detects droplets, and fluorescence in droplets are excited by the laser. The sorting device consists of an asymmetric channel and valve. When the sorting signal is on, a bright droplet is detected. Then the microvalve is activated. The swollen valve drives a target droplet into a collection channel.

This study has presented a microfluidic sorting with bilayer microvalve. Our sorting method is able to treat effectively with simple structure than FACS. Our devices are made for compacting, low-priced and high throughput screening.