On-chip multi-sorting using flow path switching by local-flow control

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High-speed, high-precision, and multi-scale on-chip flow control

On-chip dual membrane pumps
Piezoelectric actuator pumps
Glass membrane
3D hydrodynamic focusing
Vertical sheath inlet
Horizontal sheath inlet
Sample inlet

Input voltage

Response speed: 16 µs
Sorting width: 148 µm
Precision: 3.0 µm

Benchmark of on-chip cell sorting

High-rigidity microfluidic chip

Experiments of on-chip cell sorting

Experiments of on-chip cell sorting

Target: Euglena gracilis
Target: GCIY-EGFP

Max. event rate: 23 kHz
Success rate: 92.8%
Purity: 99.8%
Viability: 90.8%

Max. event rate: 11 kHz
Success rate: 97.8%
Purity: 98.9%
Viability: 90.7%

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Reference:

Fabrication process

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