

Supporting Information

Sampling from Nanoliter-Volume Sample and Comprehensive Two-Dimensional Manipulation of Individual Microfluidic Droplets

Kai Zhang,^{†,‡} Qionglin Liang,^{*,‡} Xiaoni Ai,[‡] Ping Hu,[§] Yiming Wang,[‡] and Guoan Luo^{*,†,‡}

School of Pharmacy, East China University of Science and Technology, Shanghai 200237, China, Key Laboratory of Bioorganic Phosphorus Chemistry & Chemical Biology (Ministry of Education), Department of Chemistry, Tsinghua University, Beijing 100084, China, and School of Chemistry and Molecular Engineer, East China University of Science and Technology, Shanghai 200237, China

^{*}To whom correspondence should be addressed. Phone: +86-10-62781688. Fax: +86-10-62781688. E-mail: luoga@tsinghua.edu.cn (G. L.); liangql@mail.tsinghua.edu.cn (Q. L.).

[†]School of Pharmacy, East China University of Science and Technology.

[‡]Key Laboratory of Bioorganic Phosphorus Chemistry & Chemical Biology (Ministry of Education), Department of Chemistry, Tsinghua University.

[§]School of Chemistry and Molecular Engineer, East China University of Science and Technology.

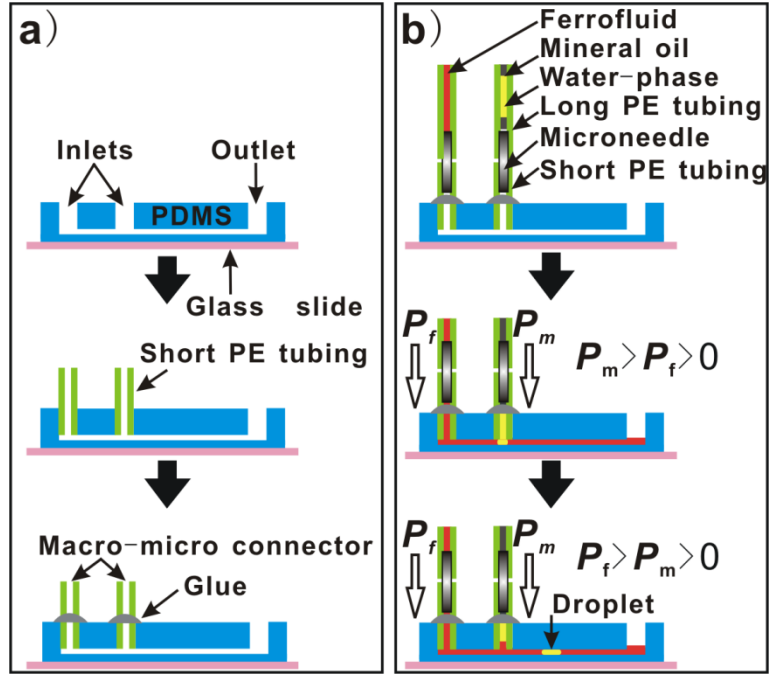


Figure S2. a) Schematic of fabrication of reusable PE tubing-based macro-micro connector. b) Schematic of injection of water-phase in closed microstructures. Droplet generation is achieved by switching hydrostatic pressure of ferrofluid (P_f) and mineral oil (P_m).

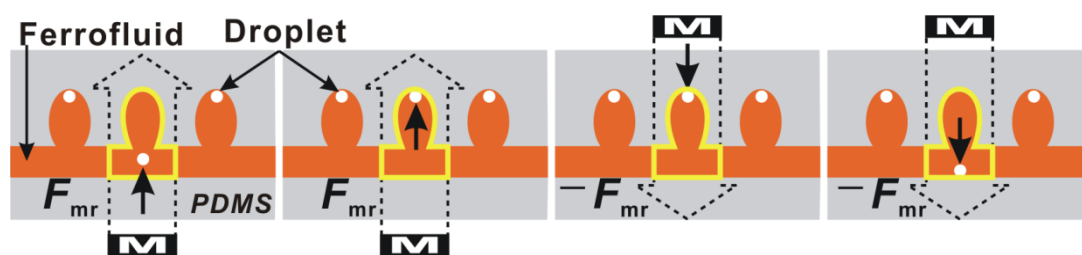


Figure S3. On-demand trapping and release of single-droplet by magnetic repulsion. The areas of black dotted lines and yellow lines represent actual and effective magnetic field gradient region, respectively.

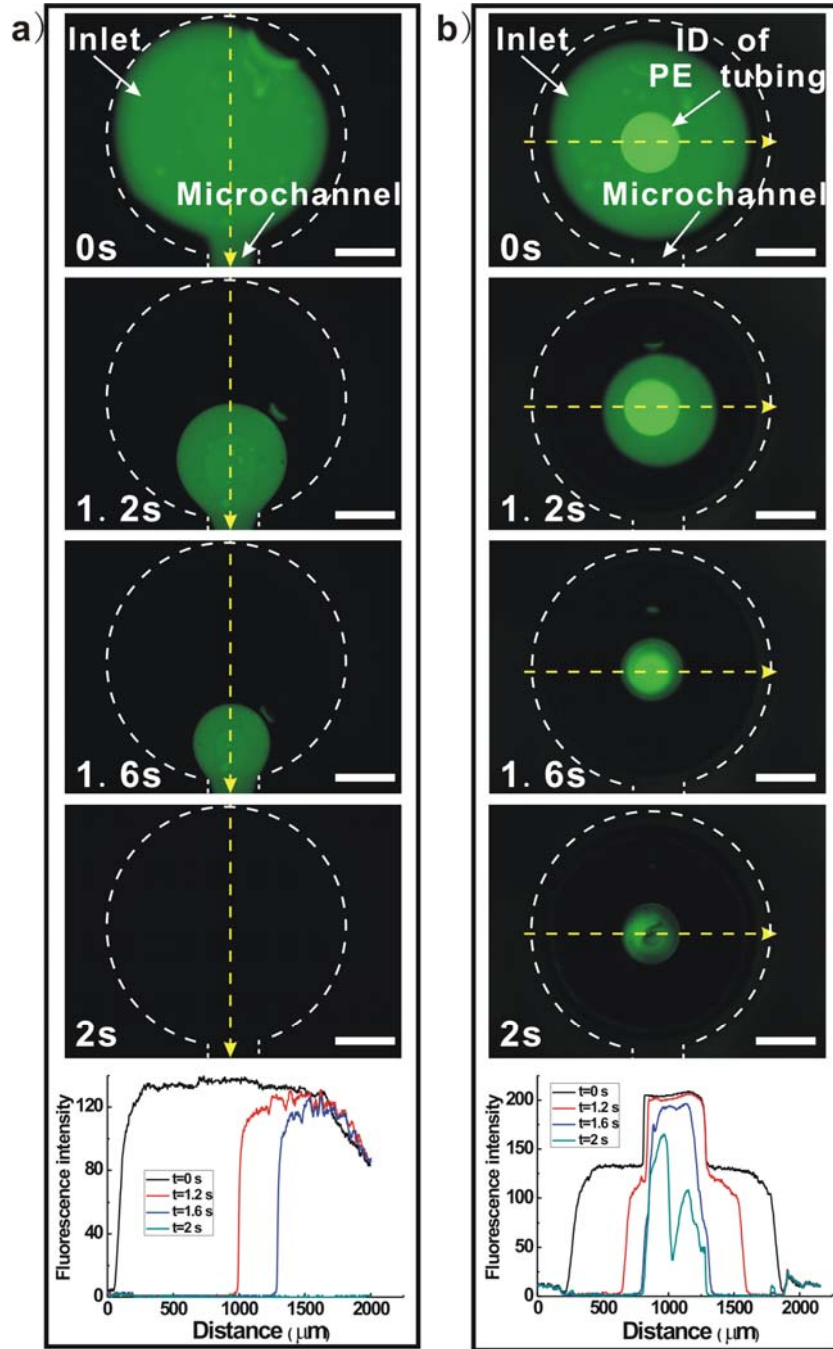


Figure S4. Two ways of removing redundant water-phase. (a) Extrusion through microchannel by positive total hydrostatic pressure of oil-phase ($P_{to} > 0$) and (b) aspiration through PE tubing by negative total hydrostatic pressure of oil-phase ($P_{to} < 0$). FITC solution (1 μM concentration) is used as water-phase for observation. The corresponding fluorescence intensity profiles across the yellow dashed arrow lines show that there is no water-phase residue at the entrance. Scale bar, 500 μm .

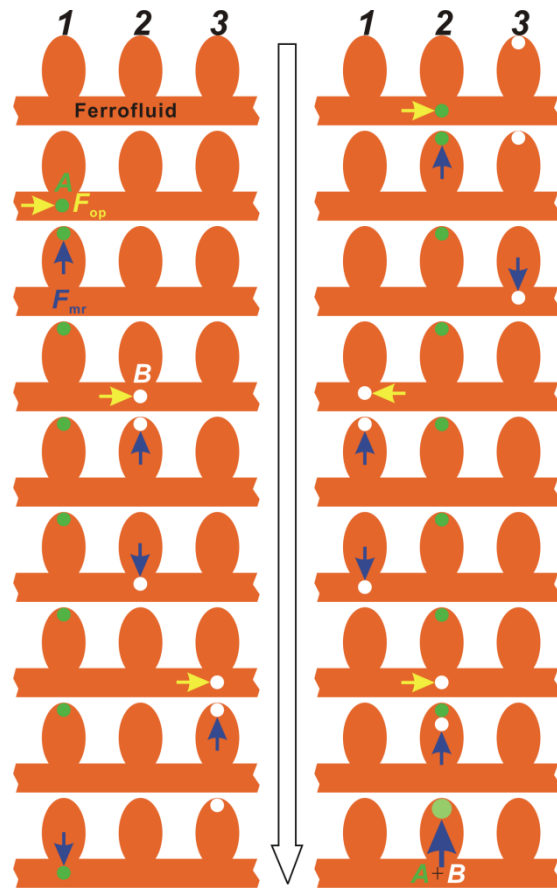


Figure S5. Schematic of detailed process of exchange of droplet position.