Electronic Supplementary Material (ESI) for Lab on a Chip.

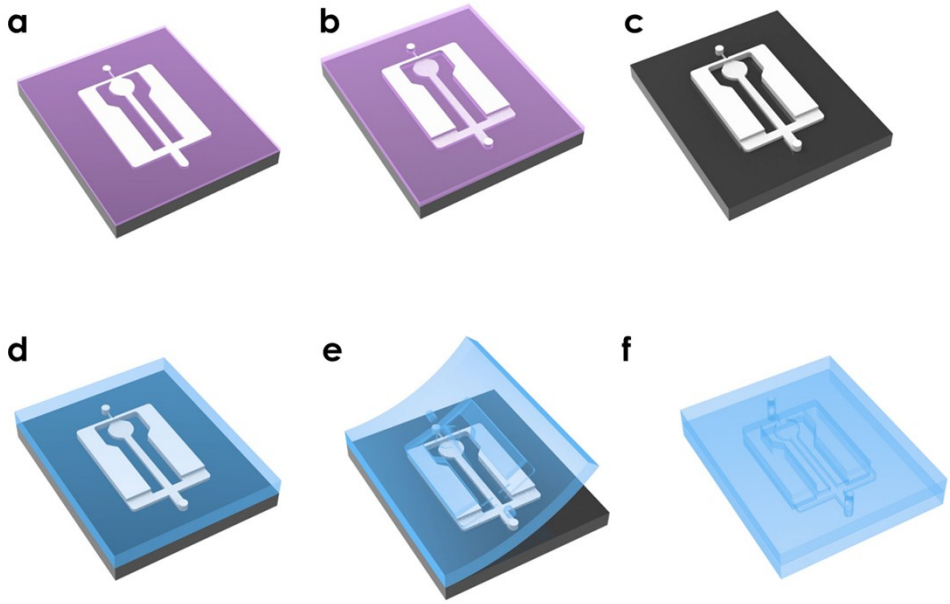

Fig. S1 Layer-by-layer fabrication of the DMC devices. Spin coating, UV light exposure and baking of a) first layer and b) second layer. c) Master after development. d) Molding of PDMS. e) Peel-off of PDMS f) Plasma bonding to form the DMC device.

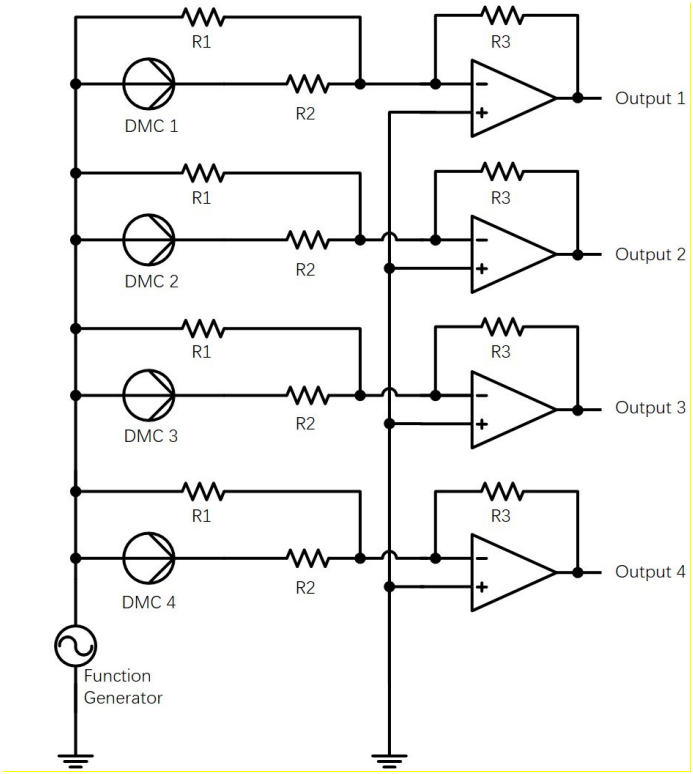

Fig. S2 Schematic of the electric circuit for the DMC devices.

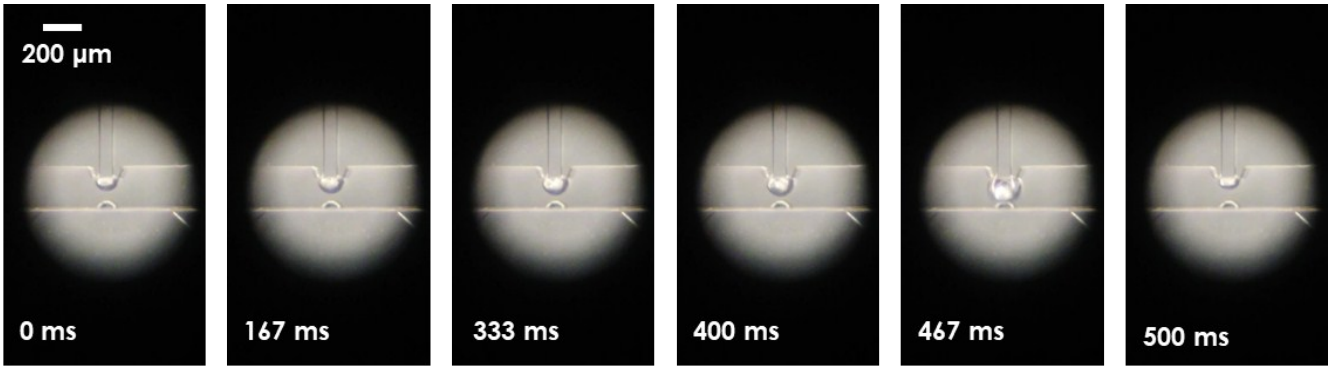

Fig. S3 Snapshots of the emergence, coalescence and pinch-off of the droplet with a smartphone camera at 30fps and flowrate of 300nL/min. The small stationary droplet is attached to the side wall of the air chamber and it is used as an indicator of the air chamber.

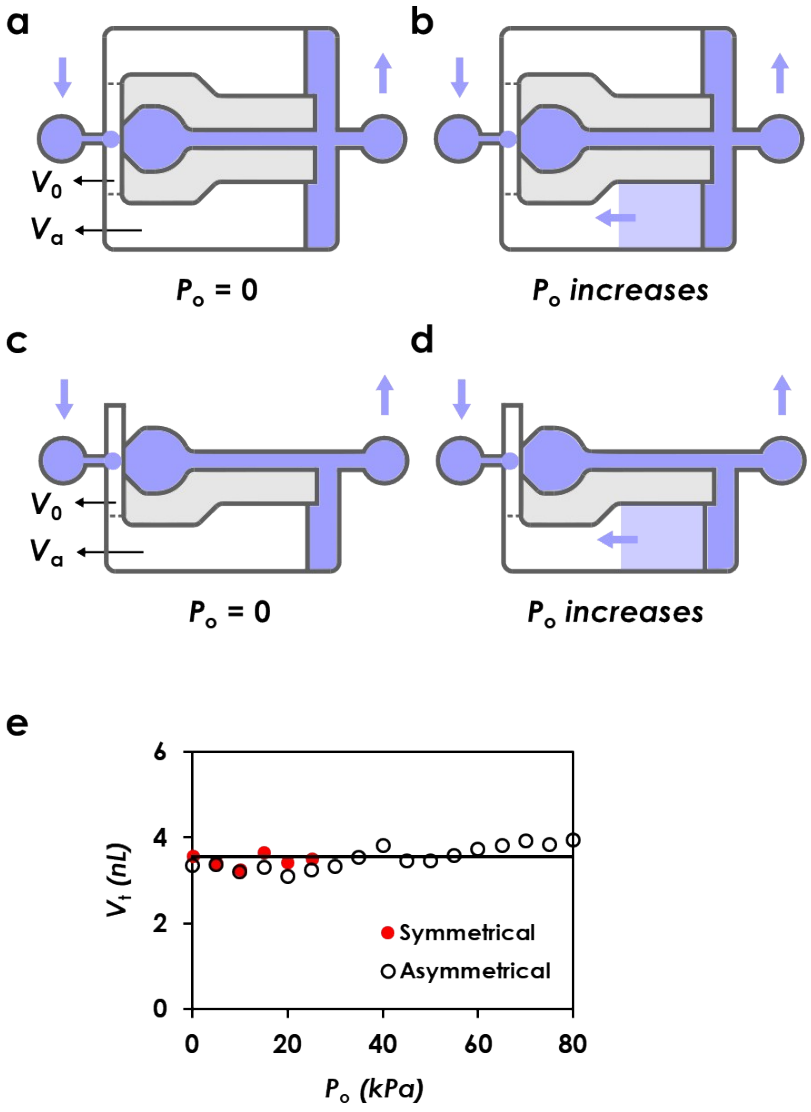

Fig. S4 Illustration of the moving of buffering interface inside the air chamber when outlet pressure is elevated at a flowrate of 5μL/min, in a-b) symmetrical and c-d) asymmetrical air chamber architecture. e) Independence of droplet transfer volume with outlet pressure.

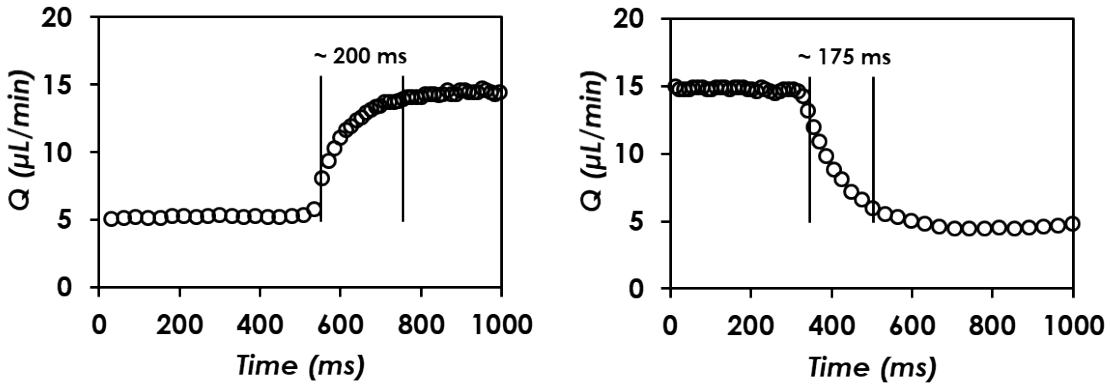

Fig. S5 Dynamic response of DMC devices with nozzle width of 100μm and separation distance of 150μm. The response time is determined to be approximately 200ms and 175ms from the dynamic response curve, respectively.