

Abstract Submitted
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Characterization on performance of micromixer using DC-biased AC electroosmosis BI-O PARK, SIMON SONG, Hanyang University — An active micromixer using DC-biased AC-Electroosmosis (ACEO) is investigated to figure out the effects of design parameters on the mixing performance. The mixer consists of a straight microchannel, with a cross section of $60 \times 100 \mu\text{m}$, and gold electrode pairs fabricated in the microchannel. The design parameters include the number of electrode pairs, flow rate, DC-biased voltage, AC voltage and AC frequency. First, we found that a mixing index became 80% $100 \mu\text{m}$ downstream of a single electrode pair with a length of 2 mm when applying a $25V_{pp}$, $2.0 V_{DC}$, 100 kHz sine signal to the electrodes. With decreasing AC frequency, the mixing index is affected little. But the mixing index significantly increases with increasing either DC-biased voltage or AC voltage. Also, we were able to increase the mixing index up to 90% by introducing alternating vortices with multiple electrode pairs. Finally, we discovered that the mixing index decreases as the flow rate increases in the microchannel, and there is an optimal number of electrode pairs with respect to a flow rate. Detailed quantitative measurement results will be presented at the meeting.

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