Supplemental Information of

Tri-fluid mixing in a microchannel for nanoparticle synthesis

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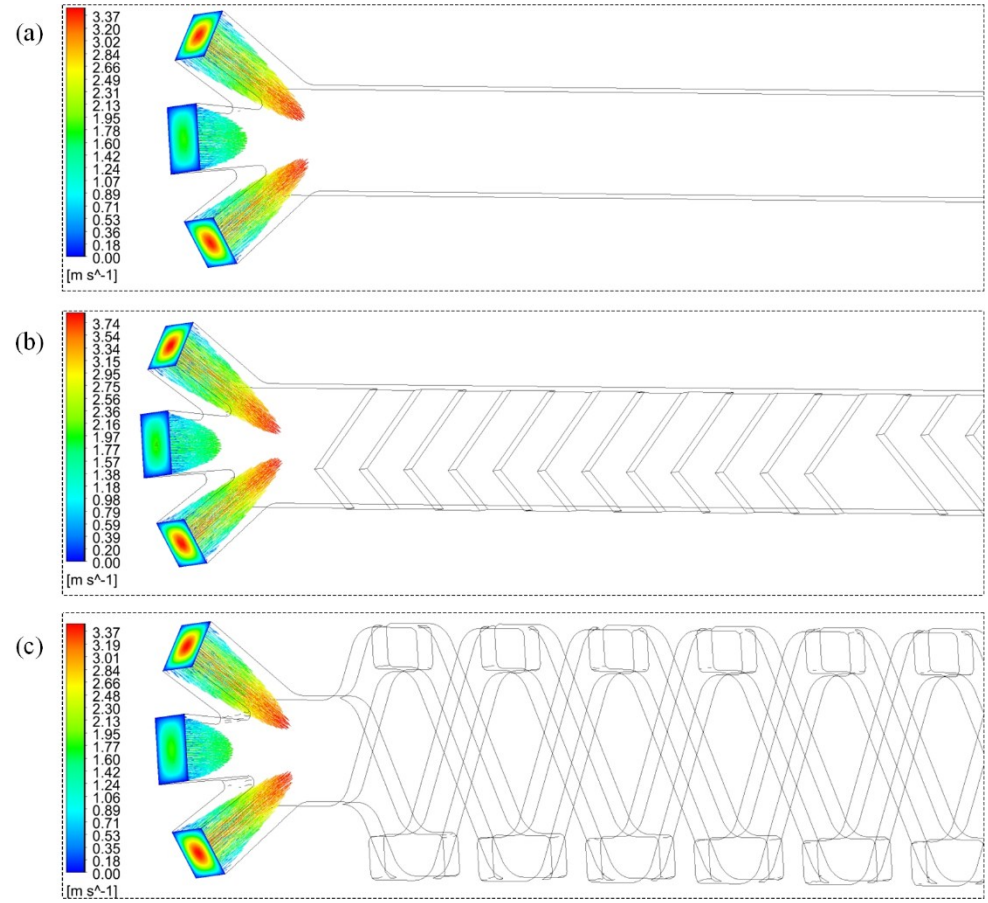

Figure S1. The definition and setting of the fully developed velocity profile (FDVP) at each inlet of the three micromixers based on the Equations 4 and 5.

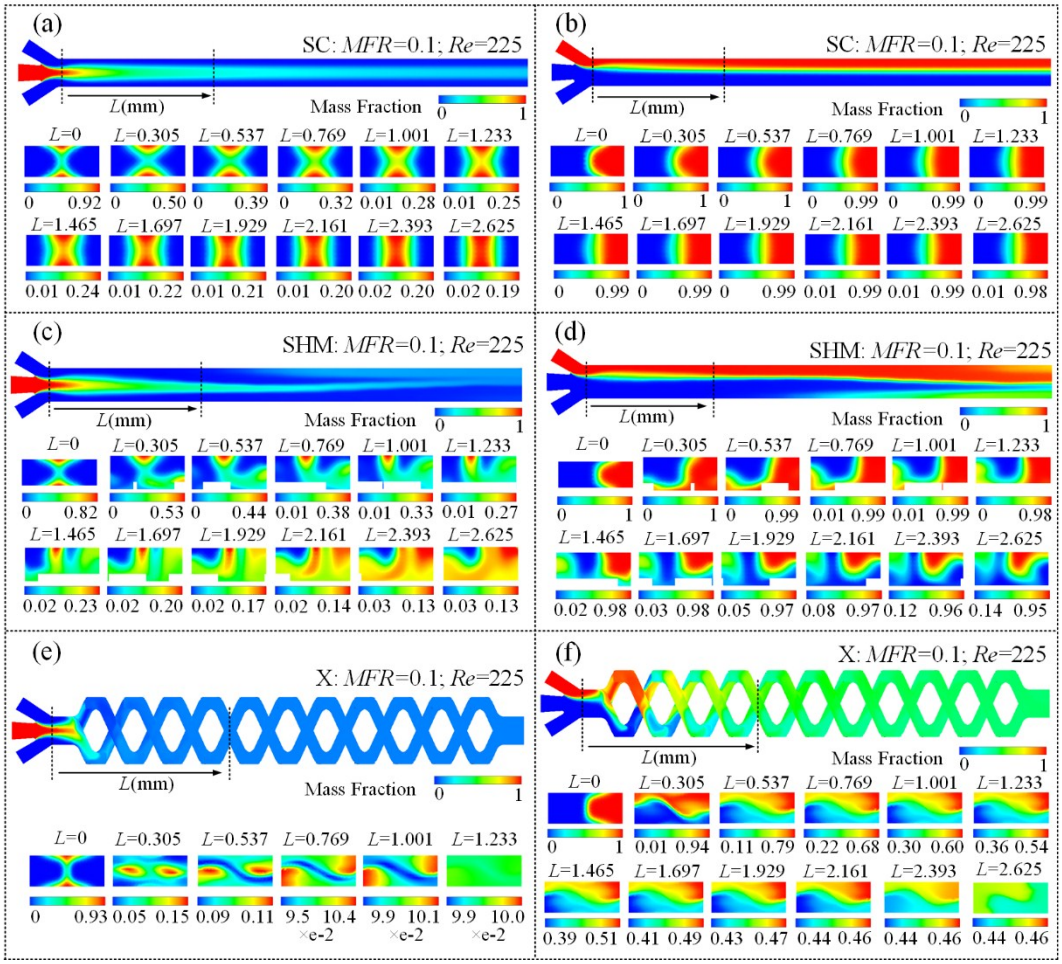

Figure S2. Analysis on MFD for the middle and side fluids in the three microchannels under conditions of Re = 225 and *MFR* = 0.1. (a), (c) and (e) show the evolution of MFD for middle fluid in SC, SHM and X, respectively. (b), (d) and (f) show the evolution of MFD for one side fluid in SC, SHM and X, respectively.

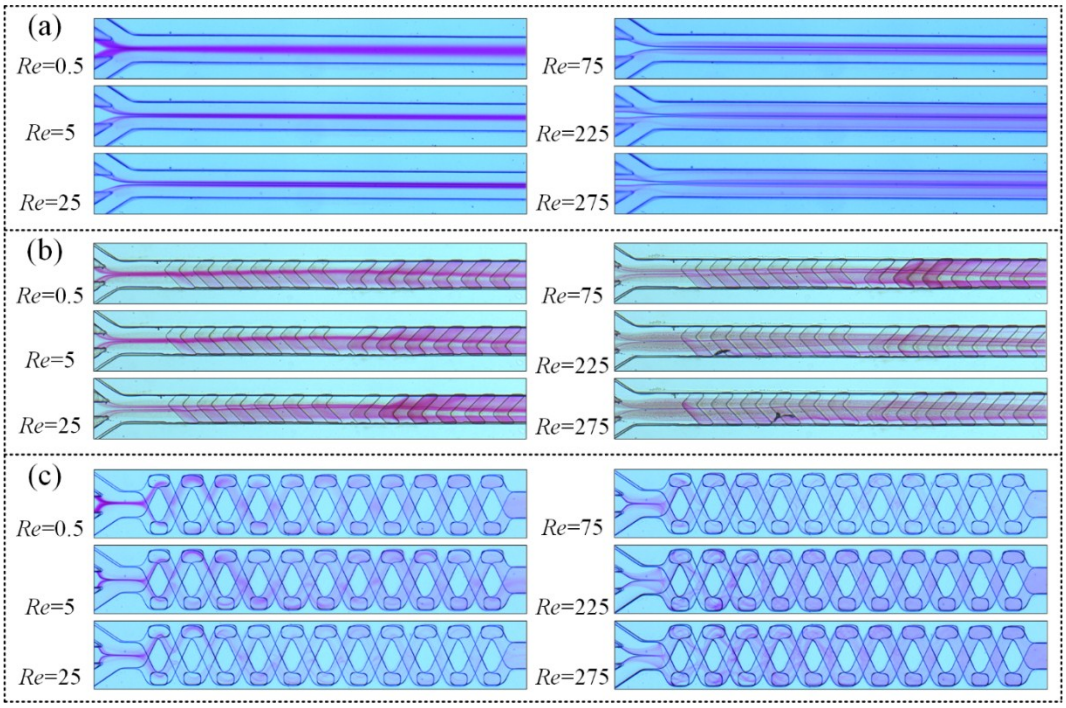

Figure S3. The experiments on the processes of the middle fluid mixing with two side fluids in three microchannels: (a) SC, (b) SHM, and (c) X. The middle working fluid was phenolphthalein indicator, *MFR* = 0.1. And the alkaline solution served as side fluids with equal flowrate. Three fluids with the order of A + P + A were introduced into each microchannel. *Re* ranged from 0.5 to 275.

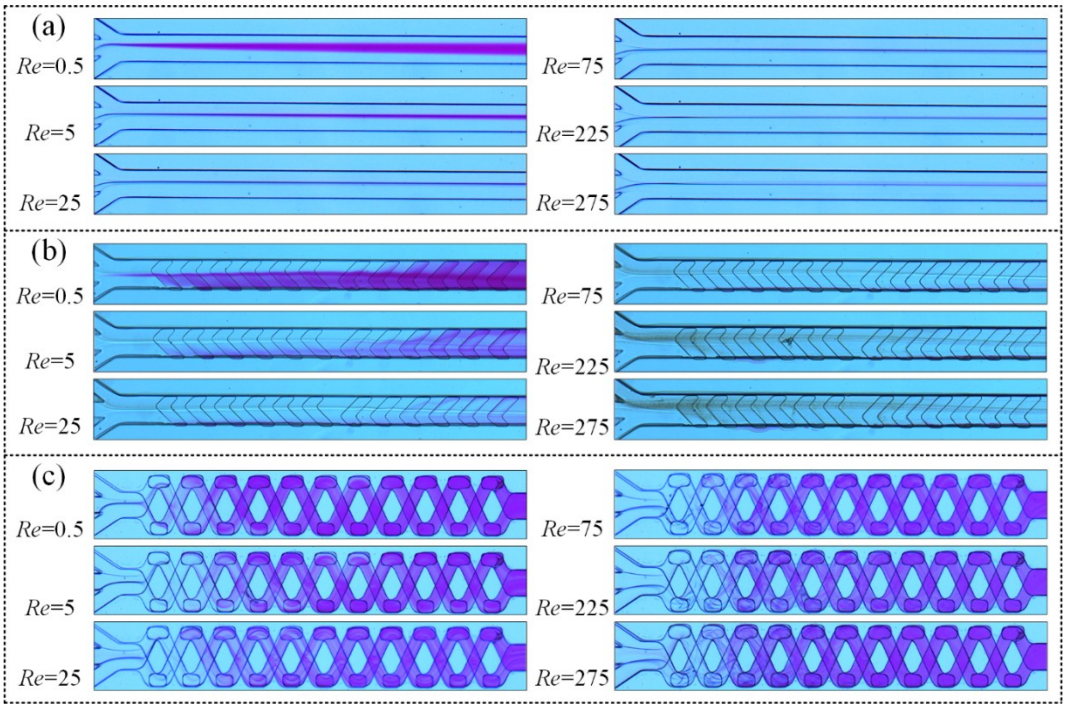

Figure S4. The experiments on the processes of mixing between the two side fluids in three microchannels: (a) SC, (b) SHM, and (c) X. The middle working fluid was the solvent, *MFR* = 0.1. And the fluids of phenolphthalein indicator and alkaline solution with equal flowrate served as side fluids. The order of P + S + A was used in these experiments. *Re* = 0.5 ~ 275.

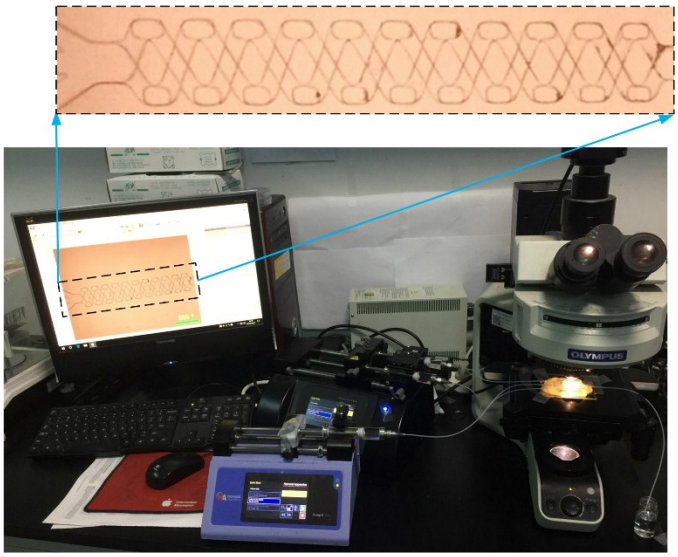

Figure S5. No obvious clogging monitored in the channel after its one hour's use.

Equations S1.

$$H_2N(CH_2)_3Si(OC_2H_5)_3 + H_2O \rightarrow HO(C_2H_5O)_2Si(CH_2)_3NH_2 + C_2H_5OH$$

$$(C_2H_5O)_3Si(CH_2)_3NH_2 + HO(C_2H_5O)_2Si(CH_2)_3NH_2 \rightarrow H_2N(CH_2)_3(C_2H_5O)_2SiOSi(C_2H_5O)_2H_2N(CH_2)_3 + C_2H_5OH$$

$$H_2N(CH_2)_3Si(OC_2H_5)_2OH + HO(C_2H_5O)_2Si(CH_2)_3NH_2 \rightarrow H_2N(CH_2)_3(C_2H_5O)_2SiOSi(C_2H_5O)_2H_2N(CH_2)_3 + H_2O$$