Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supporting Information for

Microchannel-induced change of chemical wave propagation dynamics: importance of ration between the inlet and the channel sizes

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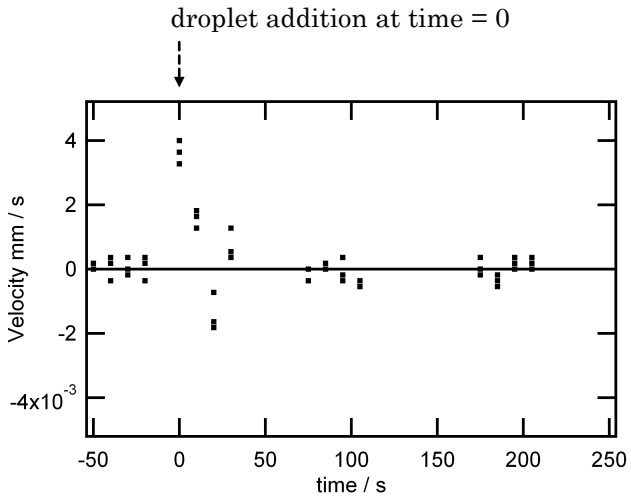

Figure S1. Movement of tracer microsphere in the microchannel filled with pure water by the addition of 1 μl pure water droplet addition at time = 0. The microsphere is 1 μm fluorescent polystyrene particles. The use of pure water instead of mixed solution and H_2SO_4 is to avoid any other influence other than the macroscopic fluid flow, such as diffusiophoresis acting on the microspheres placed in an ionic concentration gradient. Although the microsphere drifted by the droplet addition, the movement was settled down within one minute.

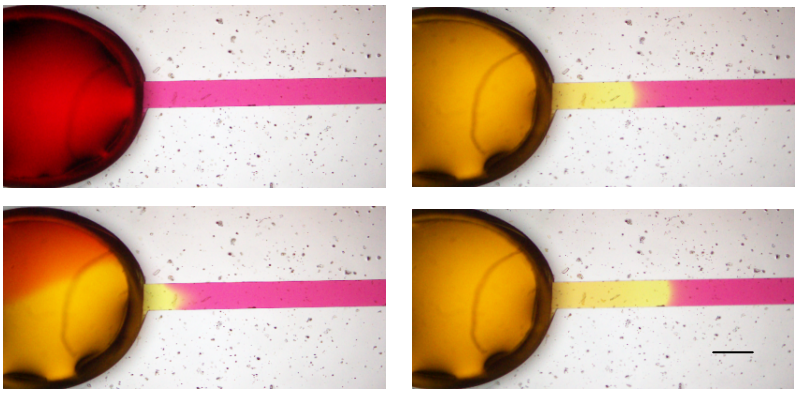

Figure S2. Snapshots of propagating proton waves taken near the inlet (w = 300 μm). Note that the pH indicators used here is different from that used in the Figure 2; methyl orange in Figure 2 and methyl red here.

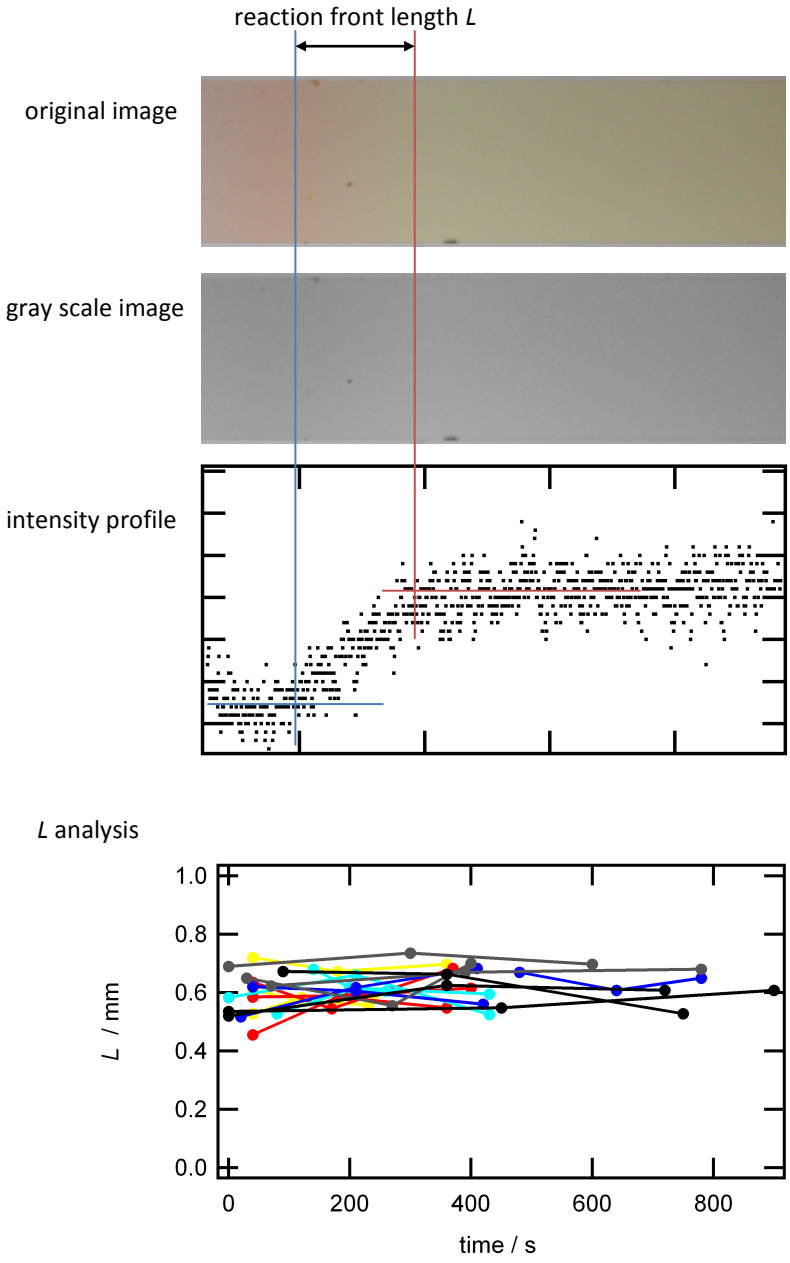

Figure S3. Analysis on the reaction front length (*L*). (from top to bottom) original image acquired during the experiment. Gray scale image converted from the original image on Adobe Photoshop program. Intensity profile acquired from the gray scale image. Form the profile, we obtained the reaction front length *L*. plots of *L* against the propagation time. the channel widths are 100 μm (yellow), 200 μm (red), 300 μm (light blue), 600 μm (blue), 1000 μm(gray), and 2000 μm (black).

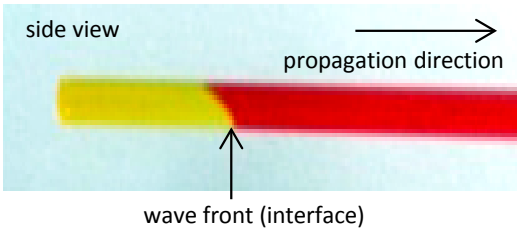

Figure S4. Side-view snapshots of propagating proton waves in a glass capillary with 2000 μm diameter. The slanted wave front (interface) can be clearly seen between the original solution (red region) and proton wave region (yellow). Use of glass capillary instead of microchannel for side-view experiment is simply due to experimental problem. The microchannels have thick walls that makes impossible to see the inside of microchannel from side. Since the effect of gravity acts similarly on the microchannel and capillary, we used the glass capillary for the side-view observations.

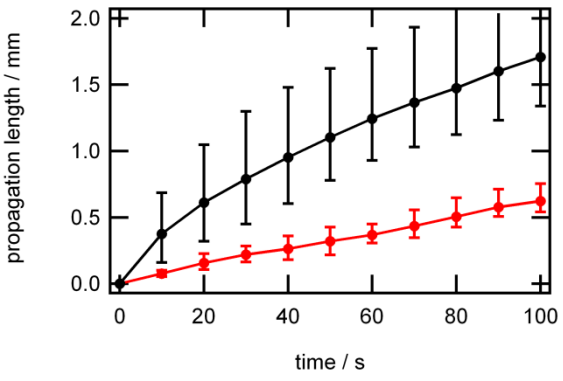

Figure S5. Propagation length of the proton wave in microchannels with the same configuration (w = 600 μm, h = 100 μm), but with different H_2SO_4 concentrations; (black) 1.0M and (red) 0.1 M.