Supporting Information

Analyzing Benzene and Cyclohexane Emulsion Droplet Collisions on Ultramicroelectrodes

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Figure S1. Photographs of emulsions. (A) benzene (5 mM ZnTPP + 400 mM IL-PA)/water emulsion, (B) cyclohexane (20 mM Fc + 400 mM IL-PA)/water emulsion.

Figure S2. CV of 5 mM ZnTPP and 400 mM IL-PA in benzene on the Au UME (dia. 10 µm) at a scan rate of 5 mV/s.
Figure S3. The $i$-$t$ curve of single benzene droplet (400 mM IL-PA) collisions in 5 mL water on the Au UME (dia. 10 µm). The UME potential was +0.65 V vs. Ag wire.
Figure S4. (A) $i$-$t$ plot of 64.6 pM of benzene (ZnTPP+ IL-PA)/water emulsion collisions on the Au UME (dia. 10 µm). (B-D) Magnified $i$-$t$ curves showing clear spike-shaped responses. The Au UME was biased at +0.65 V vs. Ag wire over the entire experimental time. (E) Comparison of droplet size distribution from eq. 3 (red bars) vs. DLS data (black line).
Figure S5. (A) i-t plot of 23.2 pM of benzene (Fc+ IL-PA)/water emulsion collisions on the Au UME (dia. 10 µm). (B) Comparison of droplet size distribution from eq. 3 (red bars) vs. DLS data (black line). The UME potential was +0.6 V vs. Ag wire.

Figure S6. (A) i-t plot of 15.2 pM of benzene (DMFc+ IL-PA)/water emulsion collisions on the Au UME (dia. 10 µm). (B) Comparison of droplet size distribution from eq. 3 (red bars) vs. DLS data (black line). The UME potential was +0.7 V vs. Ag wire.

Figure S7. (A) i-t plot of 15.2 pM of benzene (CuTPP+ IL-PA)/water emulsion collisions on the Au UME (dia. 10 µm). (B) Comparison of droplet size distribution from eq. 3 (red bars) vs. DLS data (black line). The UME potential was +0.95 V vs. Ag wire.
Figure S8. CV of 20 mM Fc and 400 mM IL-PA in cyclohexane on the Au UME (dia. 10 µm) at a scan rate of 5 mV/s.
**Figure S9.** (A) $i-t$ plot of 12.9 pM of cyclohexane (Fc+ IL-PA)/water emulsion collisions on the 10 µm Au UME. (B-D) Enlarged pictures of the $i-t$ plot. (E) Comparison of droplet size distribution from eq. 3 (red bars) vs DLS data (black line). The UME potential was +0.6 V vs. Ag wire.