Supporting Information

1. The synthesis of HPOAA

HPOAA was prepared in laboratory scale via Williamson reaction and the synthetic routes were as following: (1) (2,6-dimethylheptyl)phenol sodium was prepared by adding 0.2 mole metallic sodium to the 0.2 mole (2,6-dimethylheptyl)phenol in alcohol media and followed by stirring for 1 h at room temperature. (2) 0.2 mole sodium chloroacetate solution was added dropwise to the previous phenol sodium solution at 110°C and the reactant was stirred for 1 h. (3) The resultant solution was sequentially neutralized with 6 mol/L HCl, extracted with diethyl ether, washed with deionized water, and evaporated on a rotary evaporator until dry. (4) HPOAA was purified further by vacuum distillation at 160-180°C. Yield 76 %. Purity 99% (acid-base titration method).

\[ \delta = \frac{1}{\sqrt{2}} \left( 0H^2 - \sqrt{81H^4 - 96LD_H^2/U} \right) \]  

Where \( \delta \) is thickness of the interfacial layer (cm), \( H \) is thickness of the channel (cm), \( L \) is length of contacting interfacial area (cm), \( D_i \) is diffusivity (cm²/s), \( U \) is average velocity (cm/s).

Fig. S1 The effect of stirring speed on \( \delta \) and \( U \). \( H=0.4 \text{ cm}, \ L=4 \text{ cm}, \ D_i=6.76\text{E-07cm}^2/\text{s} \)

2. The synthesis of \([N_{\text{1888}}][\text{POAA}]\)

\([N_{\text{1888}}][\text{POAA}]\) was prepared by acid-base neutralization method. (1) 80.8 g of \([N_{\text{1888}}]\text{Cl} \), 8.0g NaOH and 55.7 g of HPOAA were added to 100 mL of methanol. (2) This mixture was stirred for 1 h at 70 °C. (3) NaCl generated was filtered and the remained mixture was washed 4 times with water. (4) The product was rotary-evaporated at 75 °C for 0.5 h and vacuum dried at 110 °C for 12 h.

Yield 98%. \( ^1H \text{ NMR (500 MHz, CDCl}_3 \delta 7.21-7.17 \text{ (m, 2H), 6.88-6.83} \text{ (m, 2H), 4.42} \text{ (s, 2H), 3.37-3.24} \text{ (m, 6H), 3.19} \text{ (s, 3H), 1.67} \text{ (d, } J = 7.0 \text{ Hz, 2H), 1.61} \text{ (d, } J = 6.9 \text{ Hz, 6H), 1.41-1.15} \text{ (m, 38H), 0.88} \text{ (t, } J = 7.0 \text{ Hz, 9H), 0.71} \text{ (s, 11H).} \text{ } ^{13}C \text{ NMR (500 MHz, CDCl}_3 \delta 173.4, 156.8, 141.4, 126.7, 126.6, 115.0, 114.0, 68.1, 61.2, 57.0, 48.7, 31.8, 31.7, 31.6, 29.1, 29.0, 26.3, 22.6, 22.3, 14.0.}

3. The effect of stirring speed on the thickness of the interfacial layer and average velocity


Electronic Supplementary Material (ESI) for RSC Advances. This journal is © The Royal Society of Chemistry 2017