Electronic Supplementary Material (ESI) for Sensors & Diagnostics.

Electronic Supplementary Information

Ion-transfer electroanalytical detection of perfluorooctanoic acid at a liquid-liquid micro-interface array

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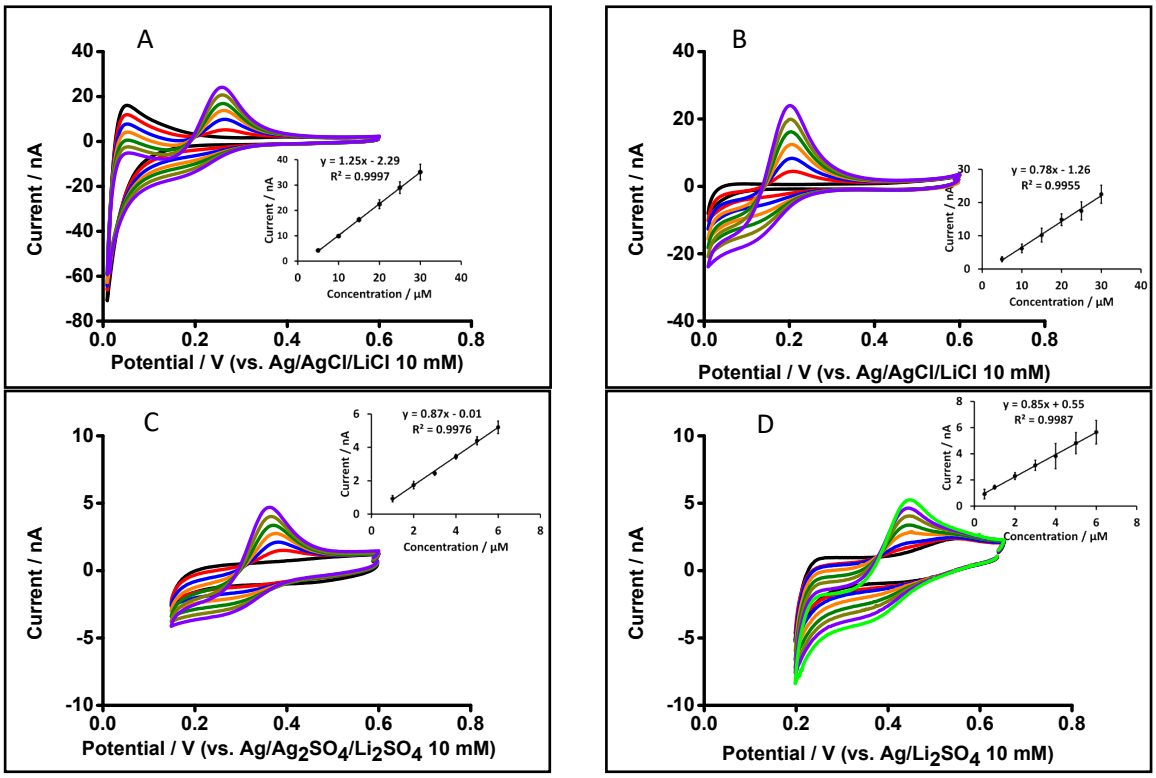

Figure S1: CVs without background-subtraction in the presence and absence (black) of PFOA in the aqueous phase. (A) 10 mM LiCl as the aqueous phase (pH = 6.0) and 10 mM BTPPATPBCl (1,2-DCE) as the organic phase using Cell 1. (B) 10 mM LiCl as the aqueous phase (pH = 6.0) and 10 mM TDDATPBCl as the organic phase using Cell 2. (C) and (D) 10 mM Li_2SO_4 as the aqueous phase (pH = 6.3) and 10 mM BTPPATPBCl (1,2-DCE) as the organic phase using Cell 3 and Cell 4, respectively. Scan rate: 10 mV s^{-1}. Insets: Calibration curve between reverse peak current and concentration of PFOA. Error bars represent ±1 standard deviation from three different independent trials; if not visible, they are smaller than the symbol size.

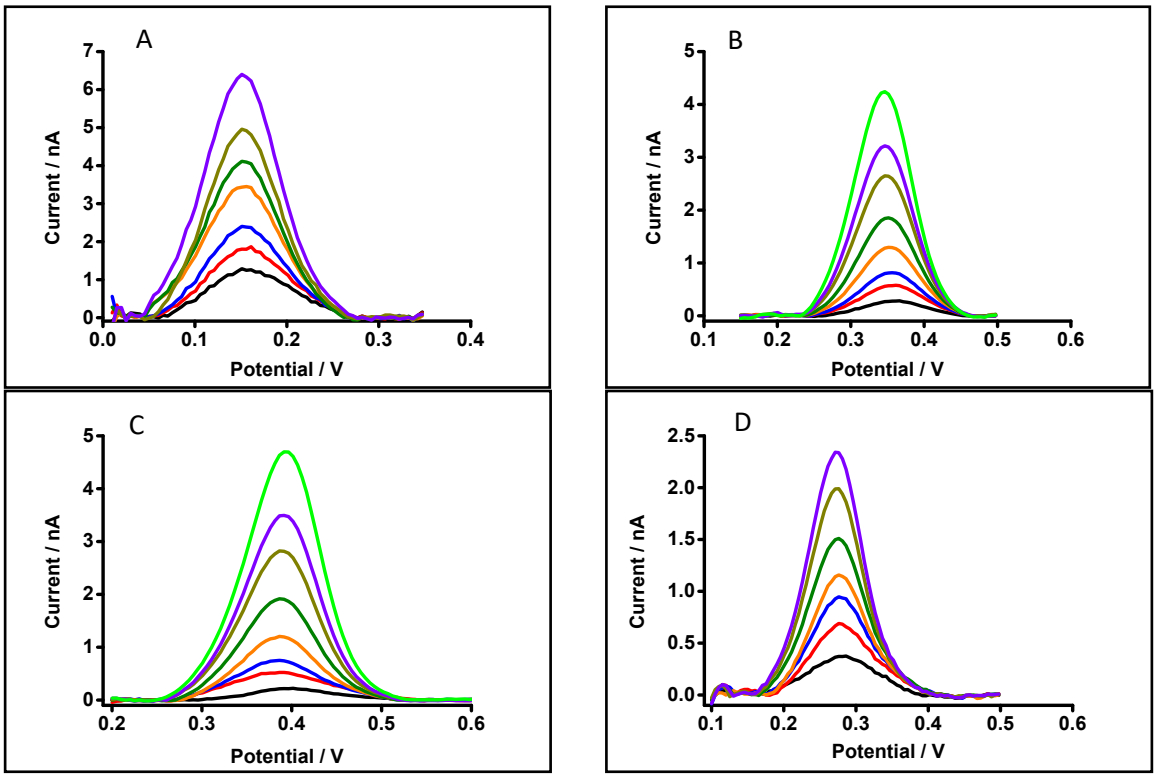

Figure S2: Background subtracted DPVs at different concentrations of PFOA at the µITIES array. (A) DPVs of backward scan using 10 mM LiCl as the aqueous phase (pH =6.0) and 10 mM TDDATPBCl (1,2-DCE) as the organic phase using cell 2. (B) DPVs of backward scan using 10 mM Li_2SO_4 as the aqueous phase (pH = 6.3) and 10 mM BTPPATPBCl (1,2-DCE) as the organic phase using cell 3. C represent backward scan DPVs using 10 mM Li_2SO_4 as the aqueous phase (pH = 6.3) and 10 mM BTPPATPBCl (1,2-DCE) as the organic phase using cell 4**.** (D) DPVs of backward scan using 1 mM LiCl as the aqueous phase (pH = 6.4) and 10 mM BTPPATPBCl (1,2-DCE) as the organic phase using cell 5.

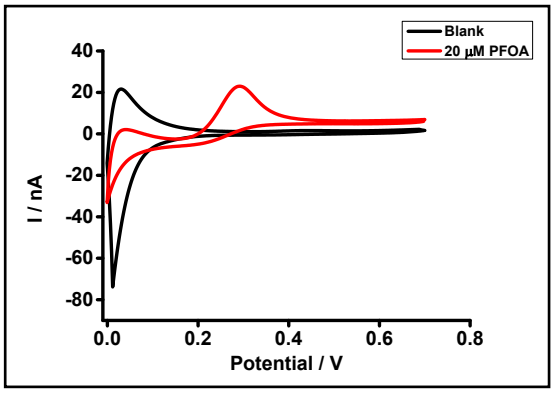

Figure S3: CVs without background-subtraction in the presence and absence (black) of PFOA in the aqueous phase. 1 mM LiCl as the aqueous phase (pH = 6.4) and 10 mM BTPPATPBCl (1,2-DCE) as the organic phase using Cell 5. Scan rate: 10 mV s^{-1}

Table S1: Comparison of different analytical approaches for detection of PFOA.

Analytical approaches	Analyte	Linear range	Sensitivity	LOD	References
Bubble-nucleation-based electrochemical sensor	PFOA	0.24-240 µM	-3.2 nA/dec	72 nM (30 µg/L)	[1]
An erythrosine B-based turn on fluorescent sensor	PFOA	0.05-10 µM	-3.7 a.u./µM	11.8 nM (5 µg/L)	[2]
Hafnium-doped oxide ($Hf.WO_3$) modified carbon paste electrode	PFOA	0.07-300 µM	0.38 µA/µM	18.3 nM (7.6 µg/L)	[3]
Molecular imprinted polymer (MIP) formed on pencil lead electrode	PFOA	10 µM-10 mM	12 mV/dec	~100 nM (41.7µg/L)	[4]
Selective ionomer coatings on screen-printed electrode	PFOA	0.77-100 µM	-	15 nM (6.5 µg/L)	[5]
Micro-ITIES array electrochemical sensor	PFOA	30-250 nM	0.003 nA/nM	1.2 nM (0.5 µg/L)	Our result

References:

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