

Supporting Information

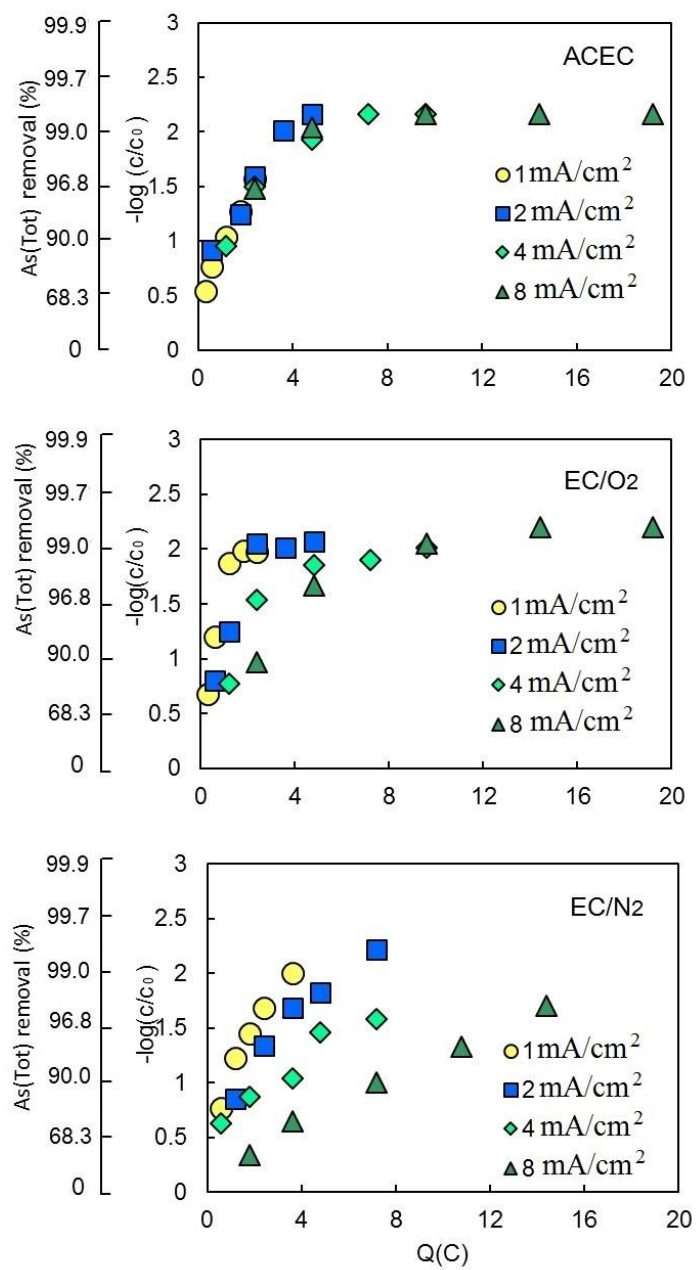


Fig. S1 Removal of As(Tot) as a function of charge under different current densities in (a) ACEC, (b) EC/O₂ and (c) EC system

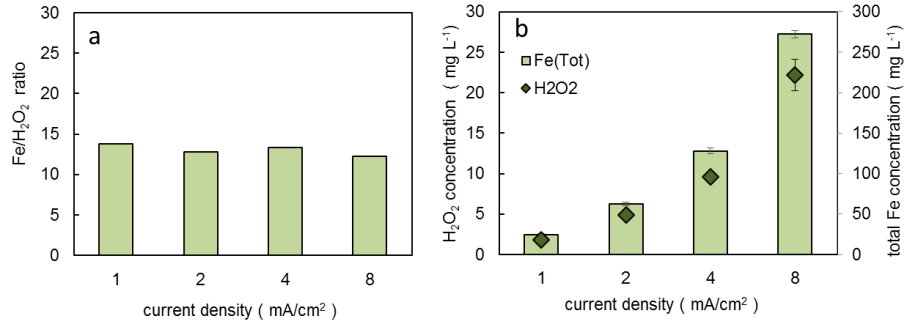


Fig. S2 (a) The ratio of Fe(Tot) generated in anode and H₂O₂ generated in cathode under different current density and (b) the concentration of H₂O₂ and Fe(Tot)

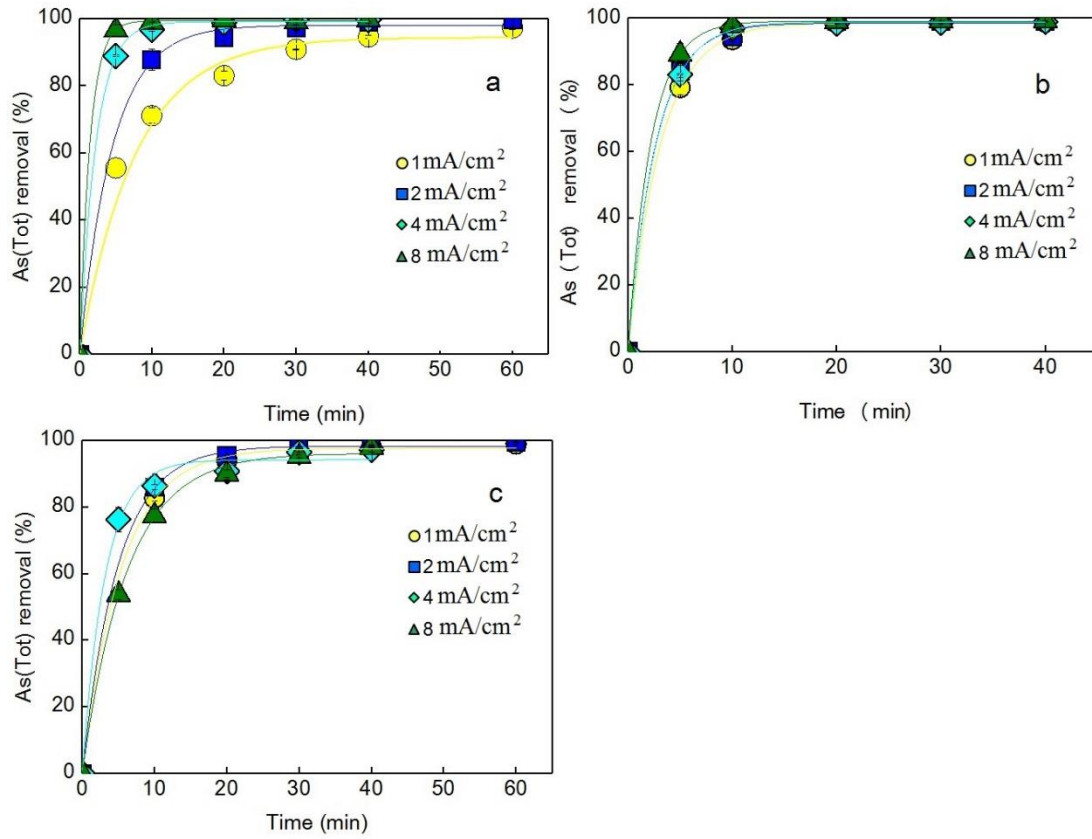


Fig. S3 The As(Tot) removal-time fitted curves in (a)ACEC, (b)EC/O₂ and (c)EC/N₂ systems

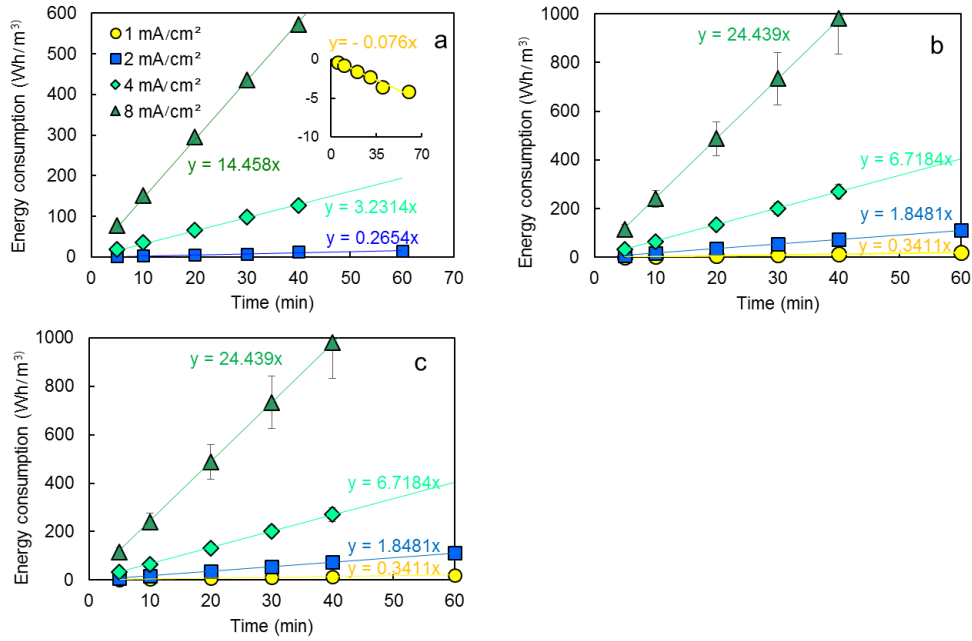


Fig. S4 The fitted curves between energy consumption (W, Wh/m³) and time (T, min): (a) ACEC (b) EC/O₂; (c) EC/N₂

Table S1 The fitted first-order kinetics equation and calculated removal time to meet the WHO standard in ACEC, EC/O₂ and EC/N₂ systems under different current densities

Experimenta group	Current density (mA/cm ²)	The fitted first-order kinetics equation	R ²	Time (min)
EC/N ₂ system	1	$R = -97.64 \cdot \exp(-0.1848 \cdot t) + 97.67$	0.999	–
	2	$R = -98.35 \cdot \exp(-0.2042 \cdot t) + 98.37$	0.999	27.5
	4	$R = -94.05 \cdot \exp(-0.3141 \cdot t) + 94.22$	0.989	–
	8	$R = -96.04 \cdot \exp(-0.1613 \cdot t) + 96.23$	0.998	–
ACEC system	1	$R = -94.09 \cdot \exp(-0.1289 \cdot t) + 94.46$	0.991	65 in real experiment
	2	$R = -98.09 \cdot \exp(-0.2204 \cdot t) + 98.12$	0.998	30.4
	4	$R = -99.12 \cdot \exp(-0.4500 \cdot t) + 99.14$	0.999	9.9
	8	$R = -99.47 \cdot \exp(-0.7136 \cdot t) + 99.47$	0.999	5.9
EC/O ₂ system	1	$R = -98.65 \cdot \exp(-0.3208 \cdot t) + 98.69$	0.999	15.5
	2	$R = -98.60 \cdot \exp(-0.3746 \cdot t) + 98.64$	0.999	13.4
	4	$R = -98.98 \cdot \exp(-0.3695 \cdot t) + 98.96$	0.999	12.5
	8	$R = -99.19 \cdot \exp(-0.4588 \cdot t) + 99.19$	0.999	9.6