Supplementary Materials

Table S1. FTIR absorption bands of CsOx formed at different NaClO concentrations.

Vibrations	Material / Wavenumber (cm^{-1})				
	CS	CsOx(0.5)	CsOx(1.0)	CsOx(2.0)	CsOx(4.0)
Str. -OH	3321	3351	3358	3356	3356
Str. -CH-	2924	2931	2926	2927	2926
Str. -CH_2-	2884	2882	2882	2879	2883
Def. C=O	1715	1735/1682	1746/1687	1745/1683	1743/1685
Def. H_2O	1640	1640	1638	1638	1640
Def. CH;CH_2	1410	1420	1417	1418	1417
Str. CH_2-OH	1342	1336	1337	1337	1341
Str. C-O	1150	1151	1169	1149	1147
Str. C-C	1072	1078	1095	1076	1076
Def. C-O-H	1001	1018	1038	1018	1018

Str.= stretching; Def.= deformation

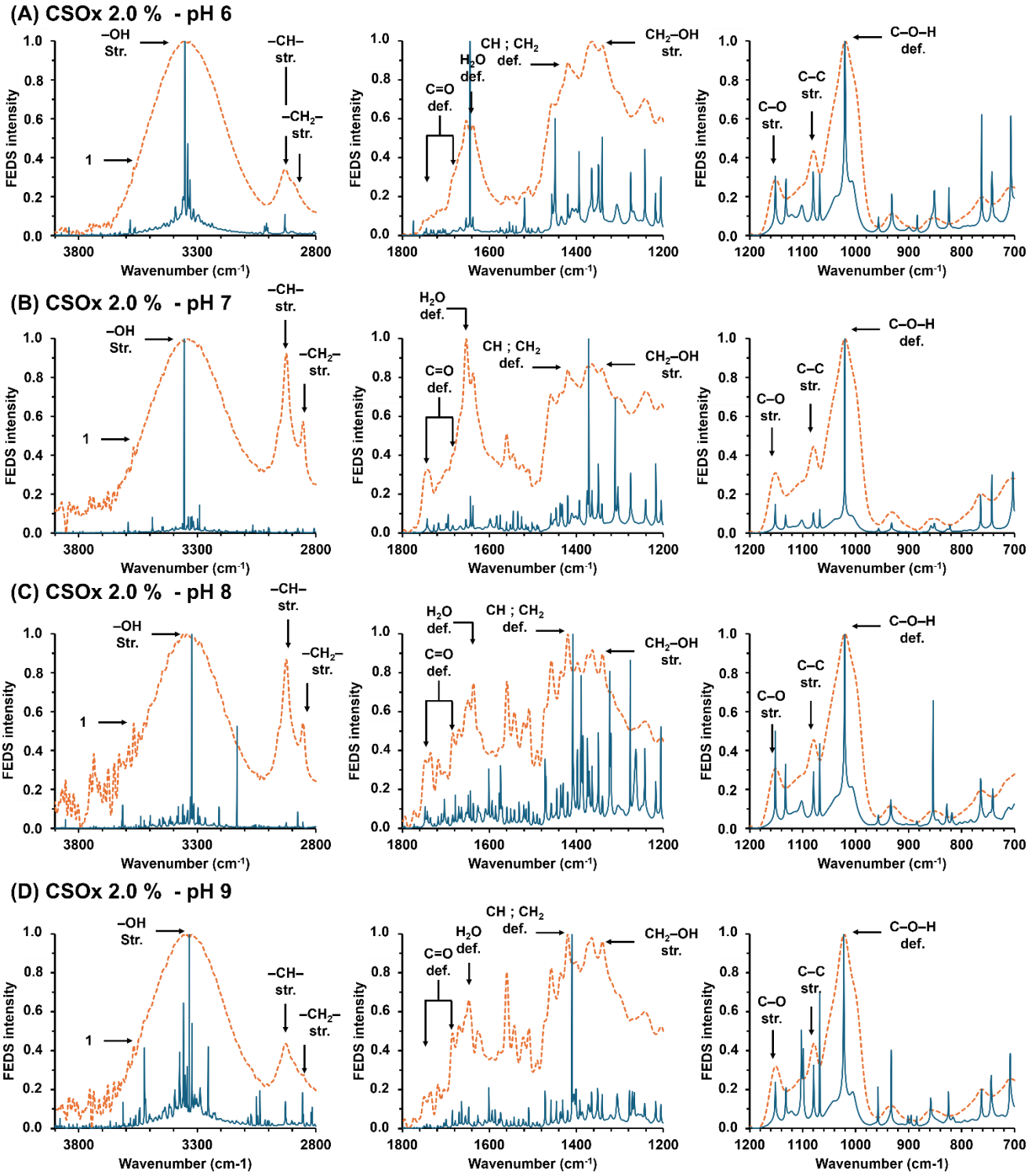

Figure S1. ATR-FTIR-FEDS spectra of CSOx 2.0 % oxidized at (A) pH 6, (B) pH 7, (C) pH 8 and (D) pH 9.

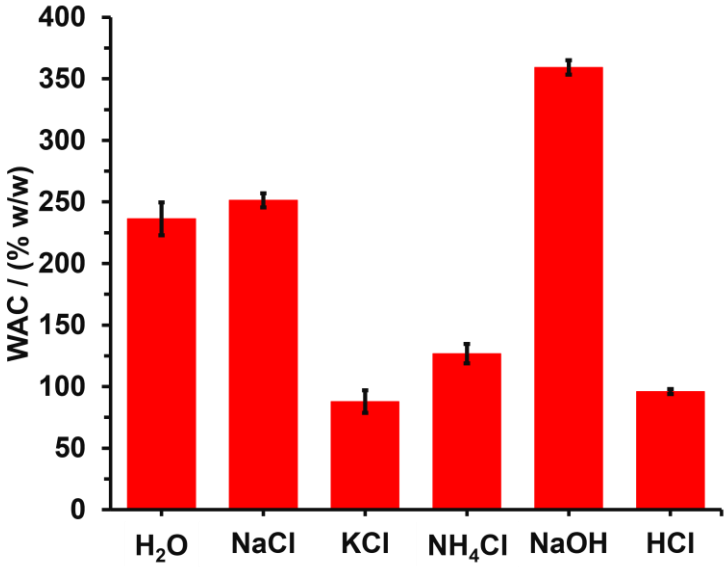

Figure S2. WAC of CsOx(2) in water and different media containing 0.5% *w*/*v* of solute (NaCl, KCl, NH_4Cl, NaOH and HCl).

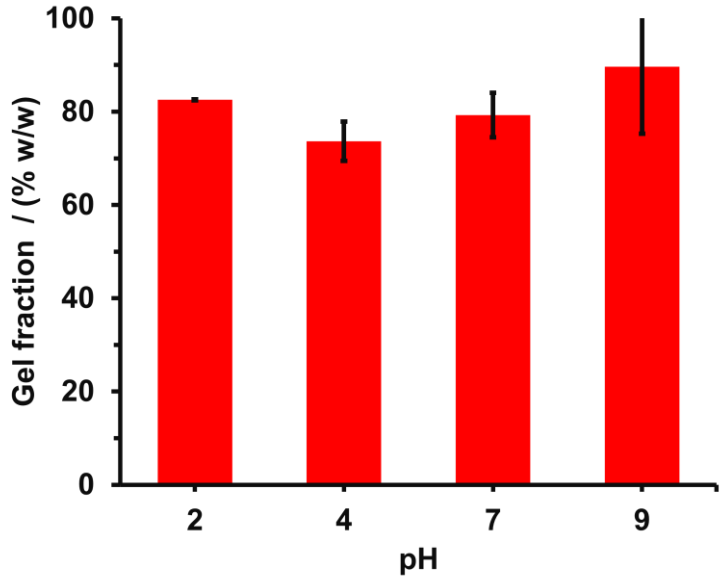

Figure S3. Gel fraction of CsOx(2) in water at different pH values (2,4,7 and 9)

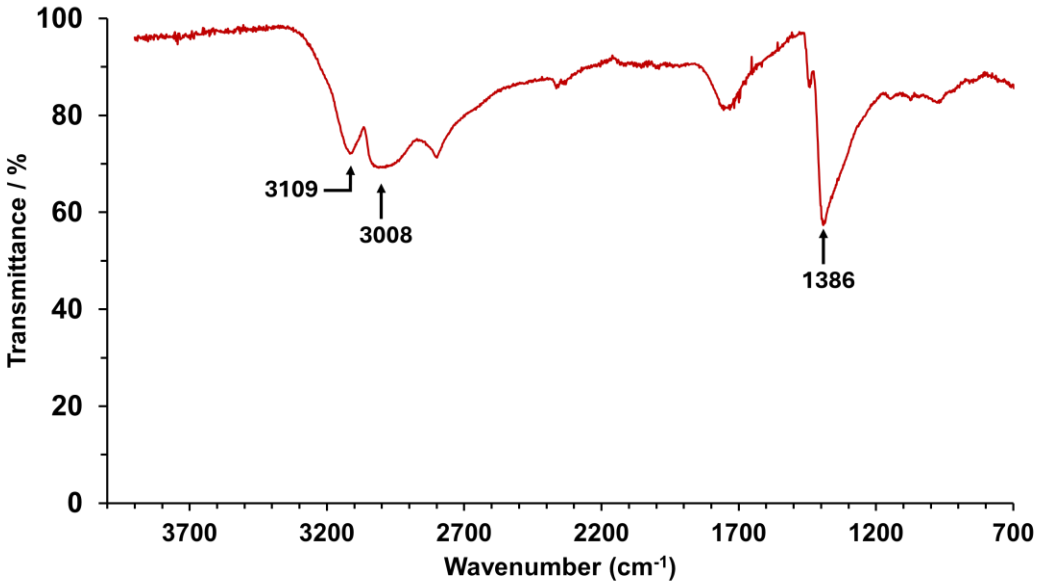

Figure S4. ATR-FTIR spectrum of CSOx(2)-300000

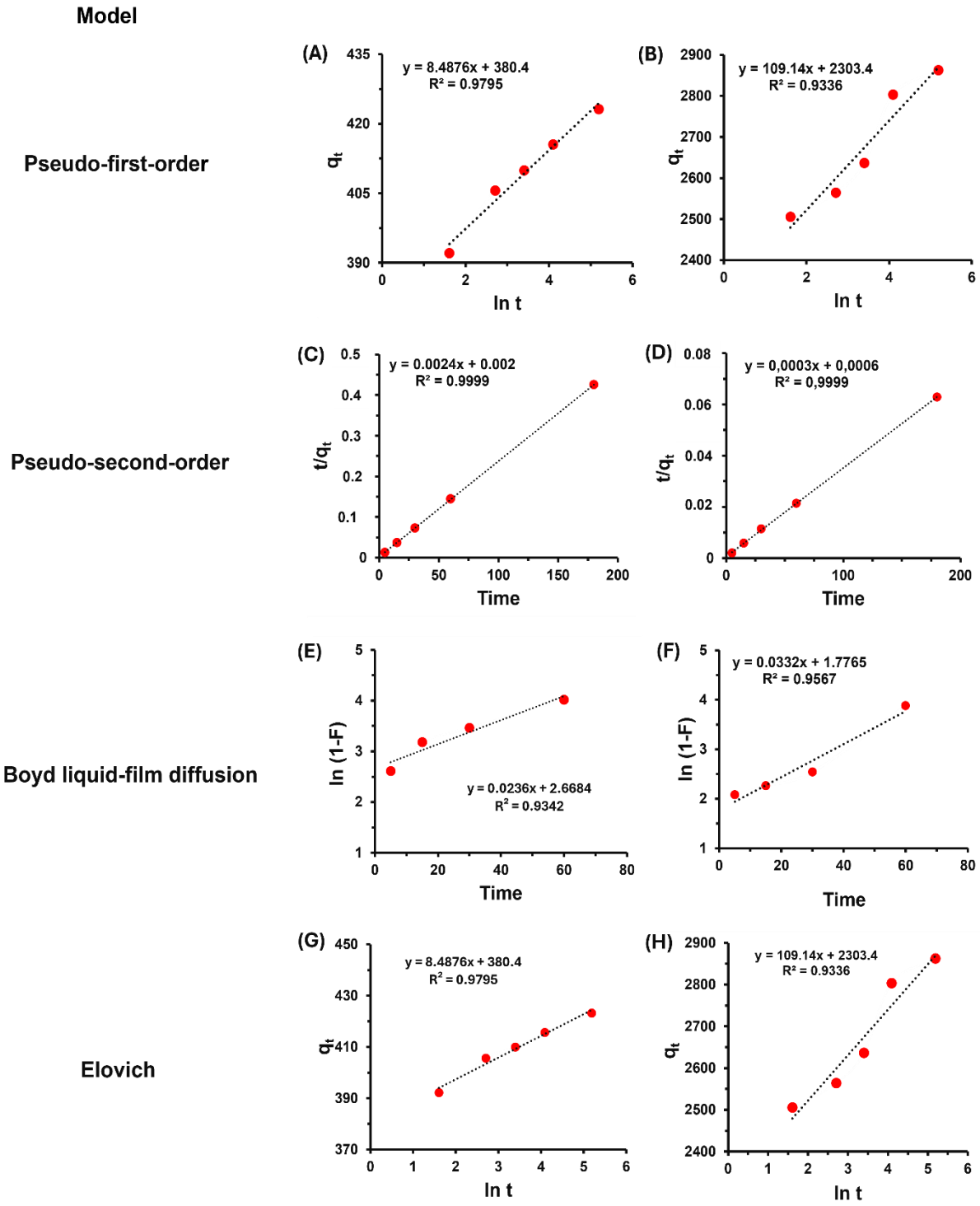

Figure S5. The fitting of kinetics models for NH_4^+ on CSOx(2) for different initial concentration: 50,000 mg/L (A, C, E, G) and 300,000 mg/L (B, D, F, H).

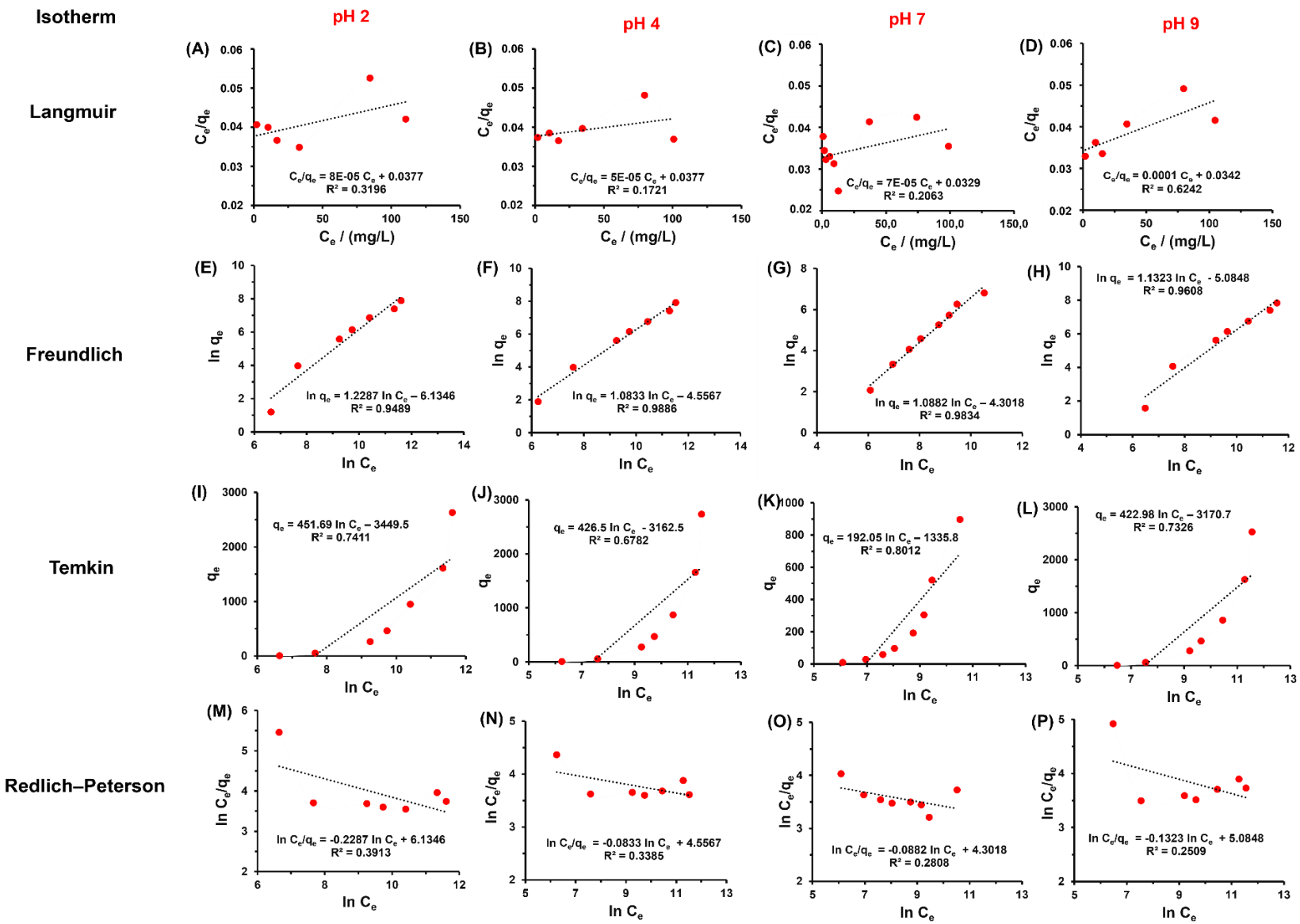

Figure S6. The fitting of isotherm models for NH_4^+ on CSOx(2) at different pH: 2 (A, E, I, M), 4 (B, F, J, N), 7 (C, G, K, O), and 9 (D, H, L, P).

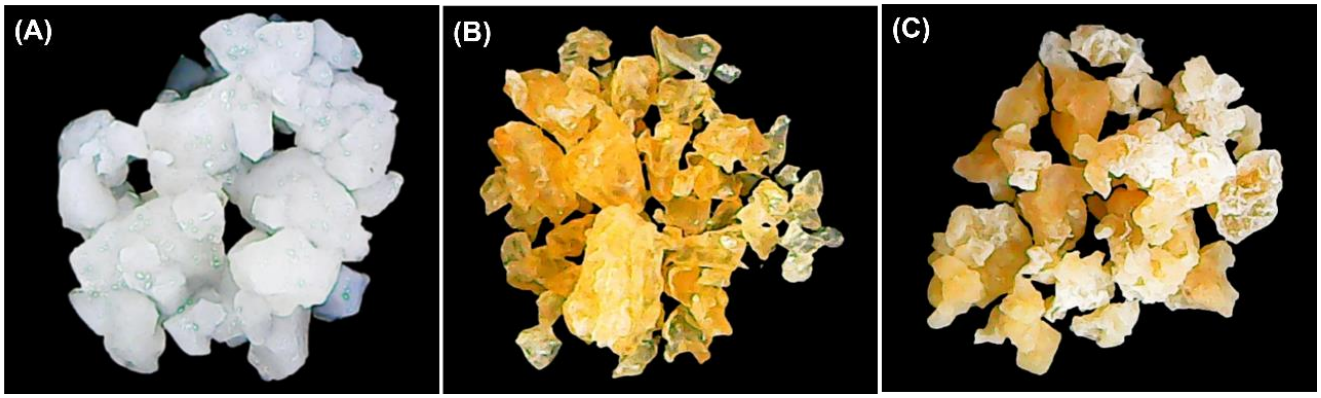

Figure S7. Digital photos of: A) CSOx(2) after 24 h adsorption of ammonium at 300000 mg/L, B) dry CSOx(2)-50000, and C) dry CSOx(2)-300000.

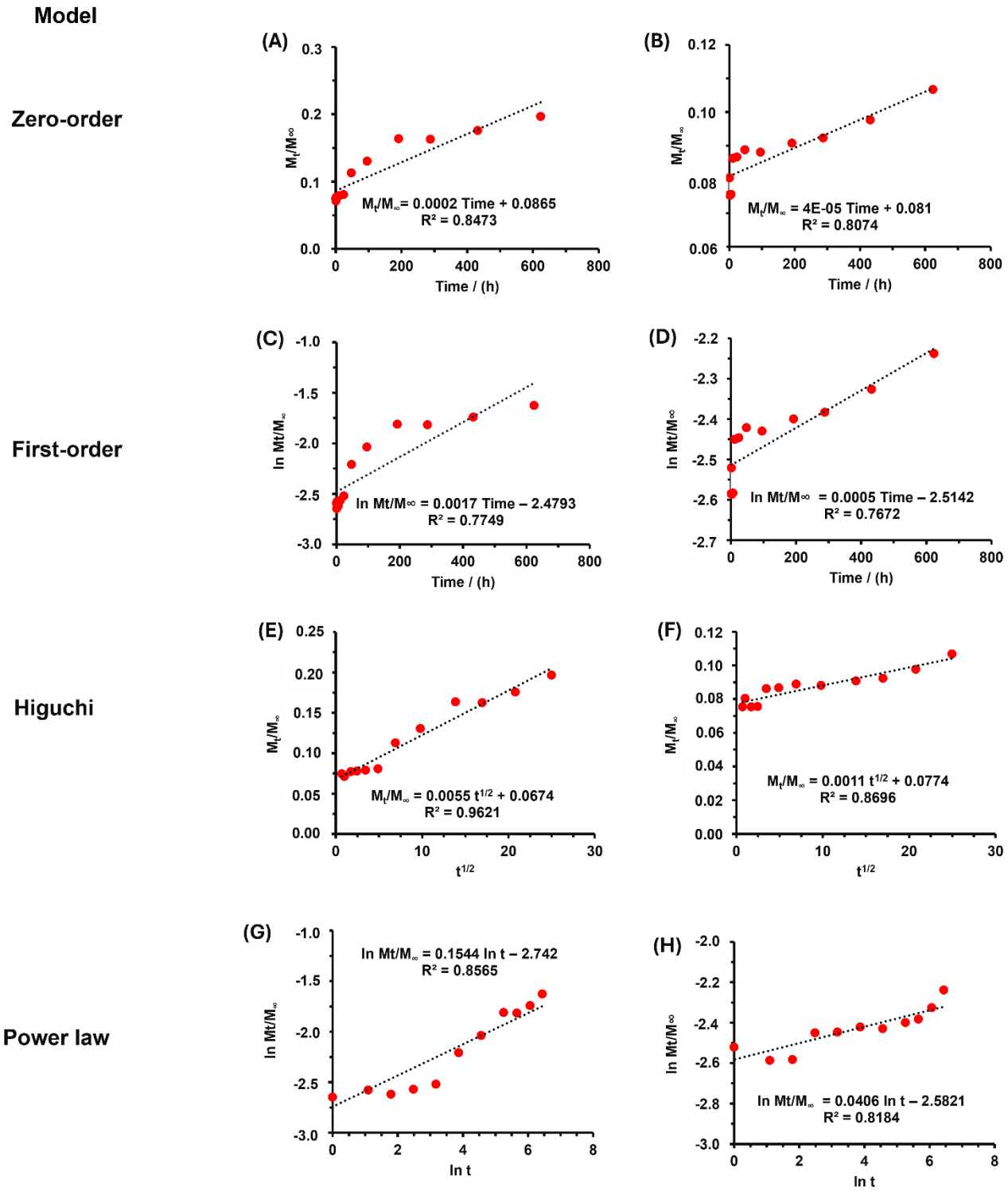

Figure S8. The fitting of kinetics models for controlled release of NH_4^+ from CSOx(2)-50000 (A, C, E, G) and CSOx(2)-300000 (B, D, F, H).

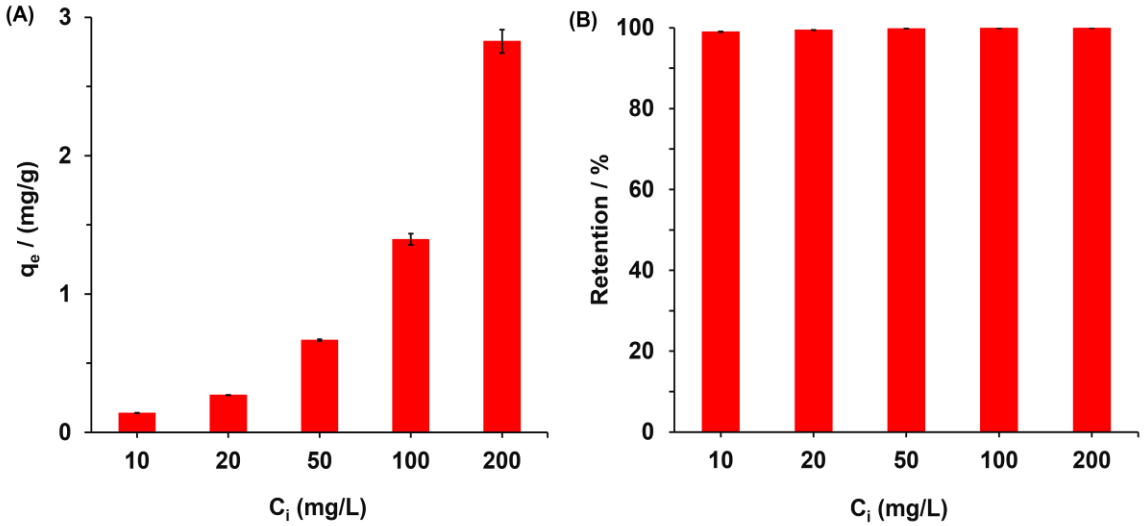

Figure S9. q_e of ammonium (A) and percentage retention of ammonium (B) as a function of the initial ammonium concentration (C_i). Conditions: temperature = 25 °C; contact time = 24 h.