Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Authors	Electrode		Electrolyte		Electrolyte, pH		Duration, Days	Voltage gradient	Removal percentage of sulfate	Source &Adopted techniques
	Anode	Cathode	Anolyte	Catholyte	Anolyte	Catholyte				
Cho J.M.[7]	Graphite	Pt-Ti	Tap water	Water	6-7	7	6	2V/cm	25.6	Saline soil, EK
Cho J.M.[15]	Ti-Pt	Graphite	Tap water	Tap water	3-7		2	1V/cm 2V/cm 3V/cm	40.3 39.3 51.6	Contaminated soil, EK
Choi J.H.[16]	HSCI	Fe	Tap water	Tap water	7-4	7-11	60	0.8V/cm	36.5-59.8	Green house soil, EK
Kim D.H.[4]	Stainless steel	Stainless steel	Tap water	Tap water	6.1	6.1	14	1V/cm	22.3	Saline soil, EK
Lee Y.J.[3]	IrO_2-RuO_2	Graphite	Water	Water	4.2	8	7	4V/cm	33.7	Contaminated soil, EK
Lee Y.J.[3]	Iron(1)	Graphite	Water	Water	4.2	8	7	4V/cm	87.9	Contaminated soil, EK
Lee Y.J.[3]	Iron(2)	Graphite	Water	Water	4.2	8	14	4V/cm	89.4	Contaminated soil, EK
Lee Y.J.[3]	BDD(1)	Graphite	Water	Water	4.2	8	7	4V/cm	23.1	Contaminated soil, EK
Lee Y.J.[3]	BDD(2)	Graphite	Water	Water	4.2	8	14	4V/cm	52.0	Contaminated soil, EK
Lee Y.J.[3]	Pt mesh	Graphite	Water	Water	4.2	8	7	4V/cm	44.1	Contaminated soil, EK
Maruthamuthu [10]	IrO_2-RuO_2-TiO_2/Ti	IrO_2-RuO_2-TiO_2/Ti	Acetic acid (0.3M)	KNO_3 (0.01M)	2-3	4-5	30	2V/cm	51.8	Spent Pb acid battery, EK
Maruthamuthu	Ti	Ti	KNO_3 (0.3M)	KNO_3 (0.01M)	2-3	4-5	30	2V/cm	49.6	Spent Pb acid battery, EK

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Soundarrajan[11]	IrO_2-RuO_2-TiO_2/Ti	Ti	Acetic acid (0.3M)	KNO_3 (0.1M)	3	4-5	2	2V/cm	32.6	Used Pb acid battery, EK

SI Table 1 Summary of the literature on sulphate removal in soil by various techniques.

Experiments Setup	System I								System II							
	Na	Al	Si	S	Cl	K	Ca	Fe	Na	Al	Si	S	Cl	K	Ca	Fe
Soil	17.97	5.25	31.63	0.45	2.39	2.54	23.5	7.08	17.97	5.25	31.63	0.45	2.39	2.54	23.5	7.08
Chemical treated	39.85	7.35	24.13	0.21	0.18	1.82	11.71	3.45	39.85	7.35	24.13	0.21	0.18	1.82	11.71	3.45
Inclusion of sulfate	24.52	7.56	22.62	1.74	0.72	4.19	22.2	13.31	44.87	7.1	23.81	1.88	0.23	1.79	11.89	4.25
Removal of sulfate, 0.01M HCl	28.05	7.28	27.23	0.26	0.53	2.54	14.86	3.56	24	5.94	38.75	0.15	0.08	2.33	15.68	4.88
Removal of sulfate, 0.1M AcOH	30.27	8.68	31.12	0.6	0.48	2.5	14.73	4.09	29.24	5.95	41.87	0.39	0.19	2.47	10.12	2.84

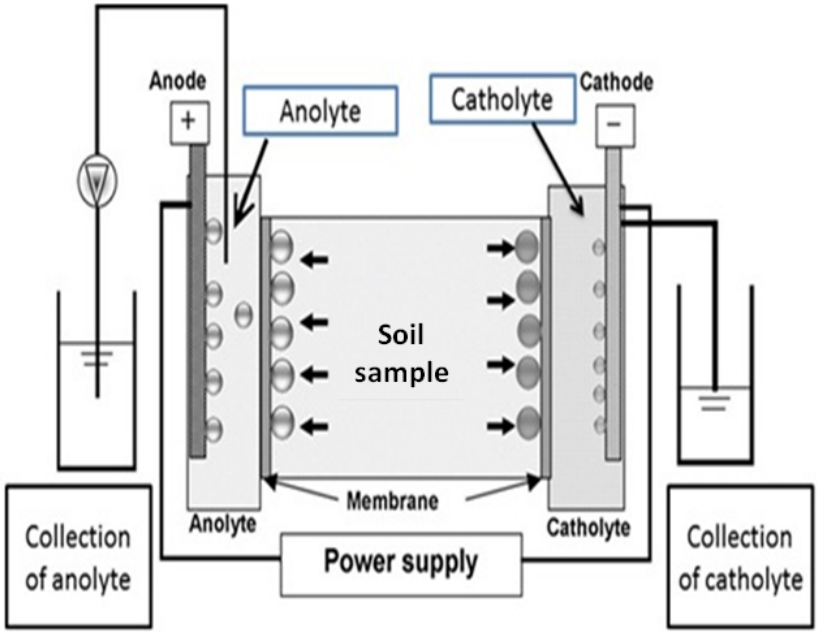
SI Table 2 XRF analysis of the contaminated soil before and after the electrokinetic experiment

Soil		**System I**		**System II**		**System Ia**		**System IIa**		**System Ib**	
Symbol	**d spacing**	**Symbol**	**d spacing**	**Symbol**	**d Spacing**	**Symbol**	**d spacing**	**Symbol**	**d spacing**	**Symbol**	**d spacing**
Q	21.12	K	26.30	K	26.29	K	26.71	Q	21.12	K	26.30
Tr	24.12	A	32.03	A	32.16	Q	28.07	Tr	22.35	Q	29.03
Bu	26.98	K	32.94	B	34.88	W	29.72	K	26.71	W	30.63
K	28.07	B	34.91	A	40.88	Tr	31.61	Q	28.20	A	32.00
S	28.64	A	40.74	B	44.83	-	-	W	29.84	J	45.66

D	29.98	B	44.87	J	52.87	-	-	-	-	J	53.56
G	33.93	J	52.97	J	55.34	-	-	-	-	J	55.48
W	35.57	J	55.42	-	-	-	-	-	-	B	58.34
W	41.02	-	-	-	-	-	-	-	-	-	-
Q	49.33	-	-	-	-	-	-	-	-	-	-
K	51.66	-	-	-	-	-	-	-	-	-	-

Dolomite – $CaMg(CO_3)_2$, Gypsum – $CaSO_4.2H_2O$, Wadalite – $Ca(AlFeMg)_5SiO_{16}Cl_3$, Bassanite – $CaSO_4.1/2H_2O$, Alunite – $KAl_3(SO_4)_2(OH)_6$, Quartz -SiO_2, Kaolinite – $Al_2Si_2O_5(OH)_4$, Trona – $Na_3H(CO_3)_2.2H_2O$, Burkeite – $Na_6(CO_3)(SO_4)$

SI Table 3 X-ray diffraction pattern illustrating the various minerals present in the soil before and after the EK process



SI Fig. 1. Schematic diagram of electrokinetic cell