

Supplement results

Title: Defluoridation of drinking water by modified natural zeolite with Cationic surfactant, in case of Ziway town, Ethiopia

Author: Dessalegn Geleta Ebsa

Table S1: measured potential and concerroping F^- concentration using unmodified zeolites Na-LSX , Na-LTA and ZR

Time(min)	0	5	15	45	60	90	120	180	240
Blank									
PoL(mV)	24.5	24.5	24.5	26.3	26.3	25.4	24.4	24.95	24.45
F-(mg/L)	8	8	9	9.5	8.99	10	10	9.87	9.99
Na-LSX									
PoL(mV)	27.3	25.7	36.6	49.8	50.2	53.8	54.2	57.4	60.5
F-(mg/L)	9.9	9.5	8.87	8.3	8	7.5	6.5	4	3.5
Na-LTA									
PoL(mV)	23.5	24.5	27.7	28.6	29.8	32	37.8	41.6	48
F-(mg/L)	10	9.4	8.9	7.4	6.43	5.89	5	4.95	3.8
ZR									
PoL(mV)	21.5	24.6	28.7	32.9	36.4	45.7	54.8	68.2	70
F-(mg/L)	9.5	8.8	7	6.5	5.5	4.5	3.5	2.5	1.5

Table S2: Effect of varying HDTMA dosage on F^- removal results by using zeolite Na-LSX

HDTMA dosage	Time(mi)	5	15	45	60	90	120	180	240
0.5g/L	PoL(mV)	24.5	24.5	26.3	26.3	25.4	24.4	24.95	24.45
1.5g/L	F-(mg/L)	8	9	9.5	8.99	10	10	9.87	9.99
2.5g/L	PoL(mV)	25.7	36.6	49.8	50.2	53.8	54.2	57.4	60.5
5g/L	F-(mg/L)	9.5	8.87	8.3	8	7.5	6.5	4	3.5
10g/L	PoL(mV)	24.5	27.7	28.6	29.8	32	37.8	41.6	48
15g/L	F-(mg/L)	9.4	8.9	7.4	6.43	5.89	5	4.95	3.8
18g/L	PoL(mV)	24.6	28.7	32.9	36.4	45.7	54.8	68.2	70
20g/L	F-(mg/L)	8.8	7	6.5	5.5	4.5	3.5	2.5	1.5

Table S3: Effect of varying HDTMA dosage on F^- removal results by using zeolite Na-LTA

HDTMA dosage	Time (min)	5	15	45	60	90	120	180	240
0.5g/L	PoL(mV)	24.5	25.5	26.3	27.3	32.4	34.4	40.5	44.5
1.5g/L	F^- (mg/L)	9.9	10	9.5	8.9	8.5	6.4	4.5	3.9
2.5g/L	PoL(mV)	28.7	46.6	49.8	50.2	56.8	58.2	57.4	60.5
5g/L	F^- (mg/L)	9.5	8.8	8.3	8	7.5	6.5	4	3.5
10g/L	PoL(mV)	24.5	27.7	28.6	29.8	32	37.8	41.6	48
15g/L	F^- (mg/L)	9.4	8.9	7.4	6.43	5.89	5	4.95	3.8
18g/L	PoL(mV)	24.6	28.7	32.9	36.4	45.7	54.8	68.2	70
20g/L	F^- (mg/L)	8.8	7	6.5	5.5	4.5	3.5	2.5	1.5

Table S4: effect for varying **HDTMA** dosage on F^- removal results by using zeolite ZR

HDTMA dosage	Time (min)	5	15	45	60	90	120	180	240
0.5g/L	PoL(mV)	25.7	26.8	27.6	28.7	34.0	36.1	42.5	46.7
1.5g/L	F ⁻ (mg/L)	10.4	10.5	10.0	9.3	8.9	6.7	4.7	4.1
2.5g/L	PoL(mV)	30.1	48.9	52.3	52.7	59.6	61.1	60.3	63.5
5g/L	F ⁻ (mg/L)	10.0	9.2	8.7	8.4	7.9	6.8	4.2	3.7
10g/L	PoL(mV)	25.7	29.1	30.0	31.3	33.6	39.7	43.7	50.4
15g/L	F ⁻ (mg/L)	9.9	9.3	7.8	6.8	6.2	5.3	5.2	4.0
18g/L	PoL(mV)	25.8	30.1	34.5	38.2	48.0	57.5	71.6	73.5
20g/L	F ⁻ (mg/L)	9.2	7.4	6.8	5.8	4.7	3.7	2.6	1.6

Table S5: effect of varying HDTMA modification reaction time on F^- removal using modified zeolites Na-LSX

MRT	Time (min)	5	15	45	60	90	120	180	240
2.5hrs	PoL(mV)	24.5	25.5	26.3	27.3	32.3	34.3	40.4	46.7
4 hrs	F ⁻ (mg/L)	9.9	10.0	9.5	8.9	8.5	6.4	4.5	4.1
6 hrs	PoL(mV)	28.7	46.5	49.7	50.1	56.7	58.1	57.3	63.5
9 hrs	F ⁻ (mg/L)	9.5	8.8	8.3	8.0	7.5	6.5	4.0	3.7
12 hrs	PoL(mV)	24.5	27.7	28.6	29.8	31.9	37.7	41.5	50.4
18 hrs	F ⁻ (mg/L)	9.4	8.9	7.4	6.4	5.9	5.0	4.9	4.0
24 hrs	PoL(mV)	24.6	28.7	32.8	36.3	45.6	54.7	68.1	73.5
48 hrs	F ⁻ (mg/L)	8.8	7.0	6.5	5.5	4.5	3.5	2.5	1.6