

WATER DEFLUORIDATION USING TERNARY METAL OXIDE-LOADED ACTIVATED CARBON BY CAPACITIVE DEIONIZATION

Tusekile Alfredy^{1,2}, Joyce Elisadiki³, Young-Deuk Kim^{4,5}, Yusufu Abeid Chande Jande^{1,2*}

¹Department of Materials and Energy Sciences and Engineering, The Nelson Mandela African Institution of Science and Technology, P.O. Box 447 Arusha, Tanzania. Email address: tusekile.alfredy@nm-aist.ac.tz; yusufu.jande@nm-aist.ac.tz

²Water Infrastructure and Sustainable Energy Futures (WISE-Futures) Centre, The Nelson Mandela African Institution of Science and Technology, Nelson Mandela Road, Tengeru, P.O. Box 9124 Nelson Mandela, Arusha, Tanzania. Email address: yusufu.jande@nm-aist.ac.tz

³Department of Physics, College of Natural and Mathematical Sciences, University of Dodoma, P.O. Box 338 Dodoma, Tanzania. Email address: joyce.lyimo2@udom.ac.tz

⁴Department of Mechanical Engineering, Hanyang University, 55 Hanyangdaehak-ro, Sangnok-gu, Ansan, Gyeonggi-do 15588, Republic of Korea. Email address: youngdeuk@hanyang.ac.kr

⁵BK21 FOUR ERICA-ACE Center, Hanyang University, 55 Hanyangdaehak-ro, Sangnok-gu, Ansan, Gyeonggi-do 15588, Republic of Korea. Email address: youngdeuk@hanyang.ac.kr

Table S1: Level of various independent variables at coded values of response surface methodology experimental design

Symbol	Independent variables	Coded levels		
		-1	0	+1
Al	Aluminum salt amount	1	2.5	4
Fe	Iron salt amount	1	2.5	4
Ti	Titanium salt amount	1	2.5	4

Table S2: Experimental design conditions and response of each experimental run.

Run	Ratio of activated carbon (g)	Ratio of aluminium salt (g)	Ratio of Iron salt (g)	Ratio of titanium salt (g)	Removal efficiency (%)
1	1	1	1	2.5	35
2	1	4	1	2.5	70.4
3	1	1	4	2.5	47.7
4	1	4	4	2.5	74.4
5	1	1	2.5	1	47
6	1	4	2.5	1	73.7
7	1	1	2.5	4	40
8	1	4	2.5	4	79
9	1	2.5	1	1	65
10	1	2.5	4	1	74
11	1	2.5	1	4	59
12	1	2.5	4	4	63
13	1	2.5	2.5	2.5	64
14	1	2.5	2.5	2.5	69
15	1	2.5	2.5	2.5	67

Table S3: Fit summary of the model

Source	Sequential p-value	Lack of Fit p-value	Adjusted R ²	Predicted R ²	
Linear	< 0.0001	0.1580	0.8302	0.7463	
2FI	0.6266	0.1320	0.8101	0.5564	
Quadratic	0.0210	0.3889	0.9500	0.7829	Suggested
Cubic	0.3889		0.9650		Aliased