Supplementary Materials

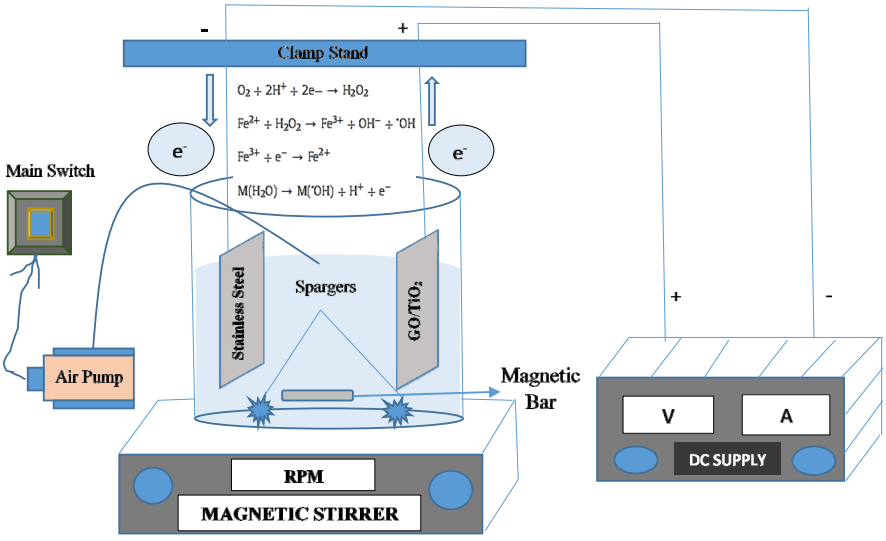

Fig. S1. Schematic diagram of the experimental setup of E-Fenton.

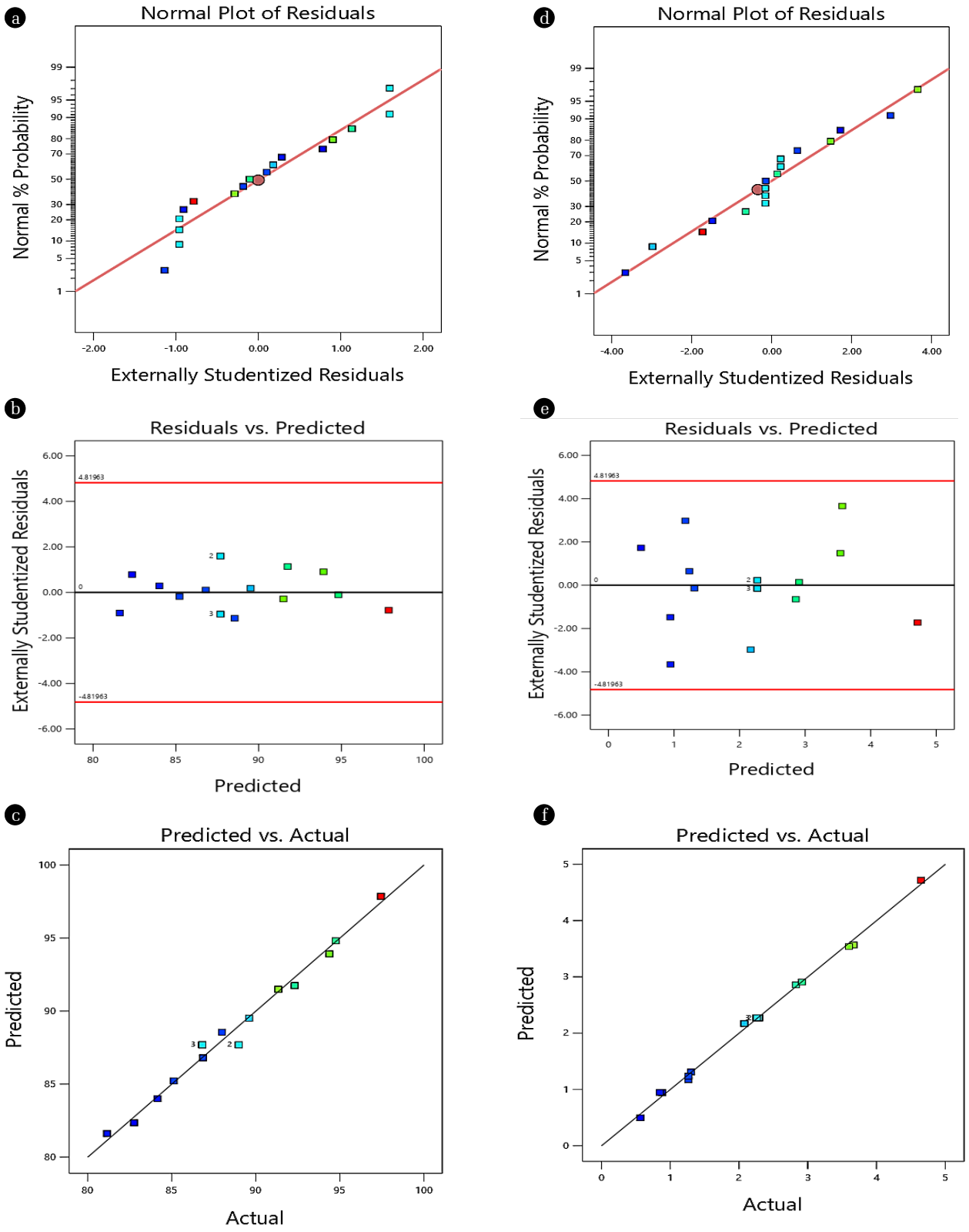

Fig. S2. Normal plots of residuals (a, d), Residuals vs. predicted plots (b, e), Predicted vs. actual plots (c, f) for % COD degradation and energy consumption, respectively.

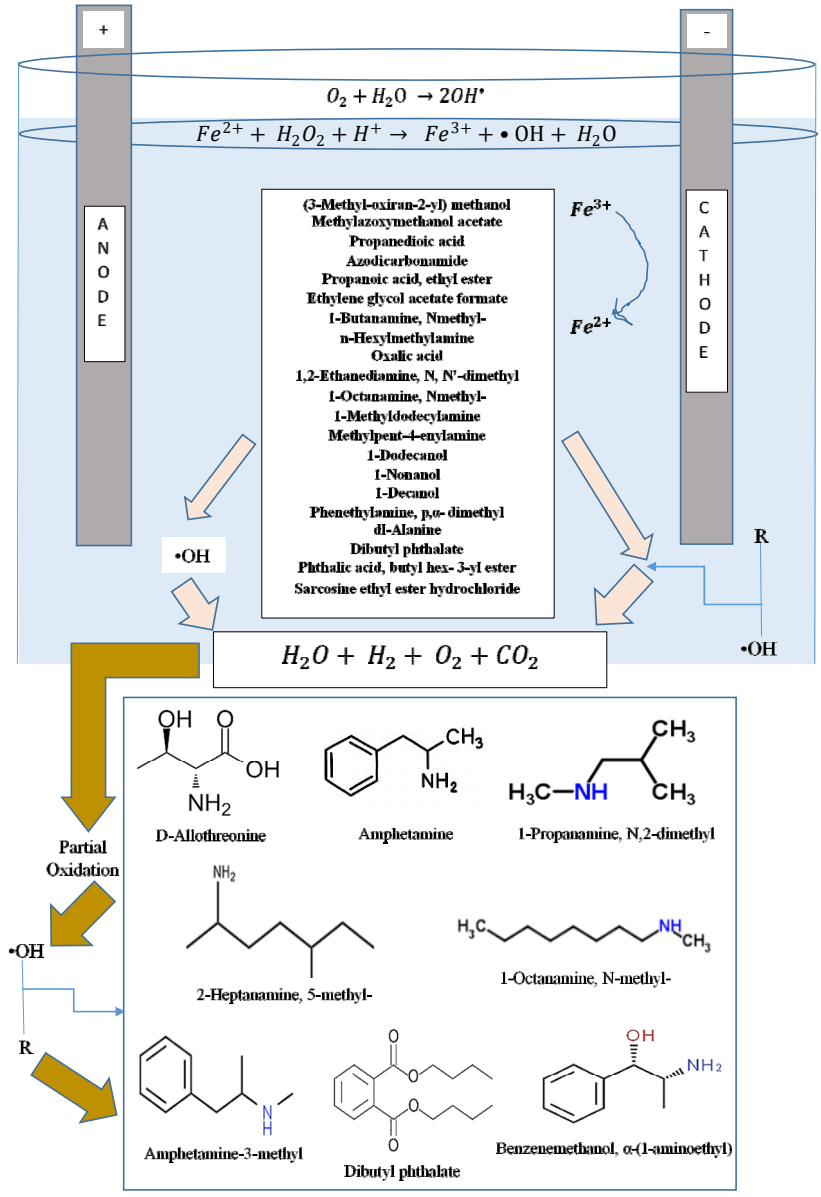

Fig. S3. Proposed pathway for the degradation of electroplating effluents by E-Fenton process.

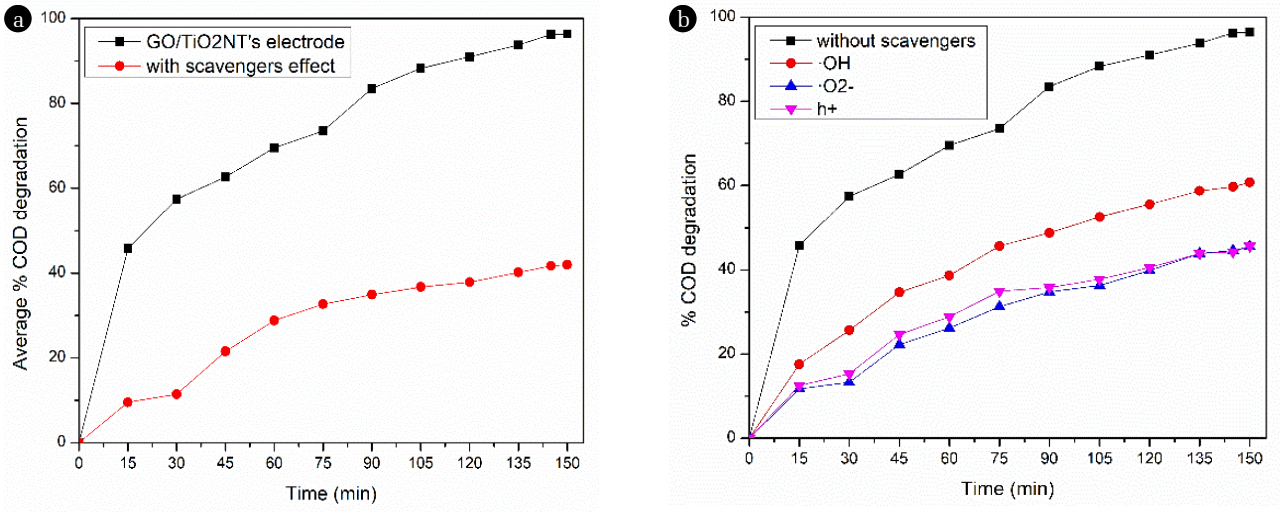

Fig. S4. (a) The average degradation of COD by GO/TiO_2NTs electrodes in the presence of scavengers and (b) Degradation of electroplating effluents in the presence of different scavengers under optimal operational parameters.

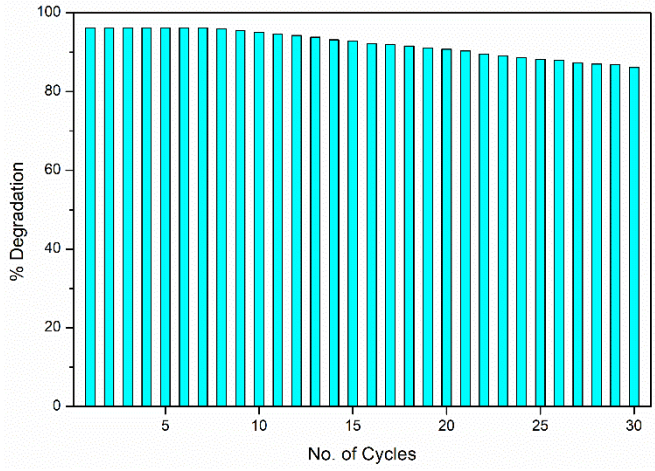

Fig. S5. Reusability and stability of GO/TiO2NTs electrode up to thirty consecutive cycles.

Table S1. Experimental design levels of chosen parameters

Factor	Parameters	Range of actual and coded variables		
		Coded Low level (-1)	Coded (0)	Coded High level (+1)
A	Time; t (min)	30	90	150
B	Current; i (Ampere)	0.4	1.0	1.6
C	Ferrous Sulphate Concentration; (CFe) (mM)	0.2	0.6	1.0

Table S2. ANOVA suggested by BBD for the % COD removal and energy consumption

Source	% COD Degradation					Energy Consumption				
	SS	DF	MS	F-value	p-value	SS	DF	MS	F-value	p-value
Model	SS	DF	MS	F-value	p-value	19.77	9	2.20	273.73	< 0.0001
A-Time	299.50	9	33.28	32.75	< 0.0001	5.19	1	5.19	646.60	< 0.0001
B-Current	62.83	1	62.83	61.84	0.0001	13.60	1	13.60	1694.11	< 0.0001
C-$FeSO_4$	195.92	1	195.92	192.82	< 0.0001	0.0003	1	0.0003	0.0431	0.8415
AB	11.59	1	11.59	11.41	0.0118	0.8741	1	0.8741	108.91	< 0.0001
AC	7.51	1	7.51	7.39	0.0298	0.0040	1	0.0040	0.4943	0.5047
BC	0.4356	1	0.4356	0.4287	0.5335	0.0002	1	0.0002	0.0307	0.8658
A^2	0.0002	1	0.0002	0.0002	0.9885	0.0970	1	0.0970	12.09	0.0103
B^2	14.96	1	14.96	14.72	0.0064	0.0016	1	0.0016	0.1988	0.6692
C^2	2.96	1	2.96	2.91	0.1319	0.0073	1	0.0073	0.9048	0.3732
Residual	3.47	1	3.47	3.41	0.1073	0.0562	7	0.0080		
Lack of Fit	7.11	7	1.02			0.0549	3	0.0183	56.10	0.0010
Pure Error	1.46	3	0.4873	0.3449	0.7958	0.0013	4	0.0003		
Correlation Total	5.65	4	1.41			19.83	16			

*DF- Degree of freedom; SS – Sum of squares; MS - Mean of squares.

Table S3. Selection of adequate model for % COD degradation and energy consumption

Source	SS	DF	MS	F-value	p-value	Remark	SS	DF	MS	F-value	p-value	Remark
	% COD degradation						Energy consumption					
Sequential model sum of squares												
Mean	1.335E+05	1	1.335E+05				81.51	1	81.51			
Linear	270.35	3	90.12	32.31	< 0.0001		18.79	3	6.26	78.11	< 0.0001	
2FI	7.94	3	2.65	0.9350	0.4595		0.8783	3	0.2928	17.86	0.0002	
Quadratic	21.21	3	7.07	6.96	0.0166	Suggested	0.1077	3	0.0359	4.47	0.0470	Suggested
Cubic	1.46	3	0.4873	0.3449	0.7958	Aliased	0.0549	3	0.0183	56.10	0.0010	Aliased
Residual	5.65	4	1.41				0.0013	4	0.0003			
Total	1.338E+05	17	7869.35				101.34	17	5.96			
Lack of fit tests												
Linear	30.61	9	3.40	2.41	0.2062		1.04	9	0.1157	354.67	< 0.0001	
2FI	22.67	6	3.78	2.67	0.1801		0.1626	6	0.0271	83.10	0.0004	
Quadratic	1.46	3	0.4873	0.3449	0.7958	Suggested	0.0549	3	0.0183	56.10	0.0010	Suggested
Cubic	0.0000	0				Aliased	0.0000	0				Aliased
Pure Error	5.65	4	1.41				0.0013	4	0.0003			
Model summary statistics												
Source	Std. dev.	R^2	Adj. R^2	Pre. R^2	Press	Remark	Std. dev.	R^2	Adj. R^2	Pre. R^2	Press	Remark
Linear	1.67	0.8817	0.8544	0.7835	66.38		0.2831	0.9474	0.9353	0.8917	2.15	
2FI	1.68	0.9076	0.8522	0.6546	105.90		0.1280	0.9917	0.9868	0.9646	0.7027	
Quadratic	1.01	0.9768	0.9470	0.8949	32.22	Suggested	0.0896	0.9972	0.9935	0.9556	0.8801	Suggested
Cubic	1.19	0.9816	0.9263			Aliased	0.0181	0.9999	0.9997			Aliased

*DF: Degree of freedom; SS: Sum of squares; MS: Mean of squares; Adj: Adjusted; Pre- Predicted.

Table S4. Various R^2 values proposed by BBD for responses % COD degradation (Z_1) and energy consumption (Z_2)

Responses	R^2	Adj R^2	Pred R^2	Adeq Precision
Z_1	0.9768	0.9470	0.8949	21.0112
Z_2	0.9972	0.9935	0.9556	61.3909

Z_1: % COD Removal; Z_2: Energy Consumption (kWh/m^3); R^2: R-squared; Adj: Adjusted; Pre- Predicted; Adeq: Adequate.

Table S5. List of various compounds identified with GC – MS analysis in untreated electroplating wastewater

S.No.	Compound	Formula	Retention Time (min)	Molecular Mass	Matching %
1	(3-Methyl-oxiran-2-yl) methanol	$C_4H_8O_2$	1.653	88.11	68.08
2	Methylazoxymethanol acetate	$C_4H_8N_2O_3$	1.710	132.11	71.47
3	Propanedioic acid	$C_3H_4O_4$	2.057	104.06	76.89
4	Azodicarbonamide	$C_2H_4N_4O_2$	2.157	116.08	75.72
5	Propanoic acid, ethyl ester	$C_5H_{10}O_2$	2.994	102.13	91.97
6	Ethylene glycol acetate formate	$C_5H_8O_4$	5.120	132.11	75.73
7	1-Butanamine, Nmethyl-	$C_5H_{13}N$	9.509	87.16	69.33
8	n-Hexylmethylamine	$C_7H_{17}N$	15.201	115.22	75.17
9	Oxalic acid	$C_2H_2O_4$	16.531	90.03	68.62
10	1,2-Ethanediamine, N,N'-dimethyl-	$C_4H_{12}N_2$	19.111	86.13	66.67
11	1-Octanamine, Nmethyl-	C_9H_21N	20.889	143.27	70.25
12	1-Methyldodecylamine	$C_{13}H_{29}N$	22.139	199.38	71.87
13	Methylpent-4-enylamine	$C_6H_{13}N$	22.139	99.17	70.62
14	1-Dodecanol	$C_{12}H_{26}O$	22.340	186.33	89.34
15	1-Nonanol	$C_9H_{20}O$	22.632	144.25	70.08
16	1-Decanol	$C_{10}H_{22}O$	25.153	158.28	79.94
17	Phenethylamine, p,α- dimethyl-	$C_{10}H_{15}N$	25.821	149.23	81.23
18	dl-Alanine	$C_3H_7NO_2$	27.709	89.09	79.27
19	Dibutyl phthalate	$C_{16}H_{22}O_4$	27.827	278.34	87.97
20	Phthalic acid, butyl hex- 3-yl ester	$C_{18}H_{26}O_4$	29.354	306.39	85.62
21	Sarcosine ethyl ester hydrochloride	$C_5H_{11}NO_2$	30.699	153.61	78.38

Table S6. List of various compounds identified with GC – MS analysis in E-Fenton treated electroplating wastewater

S.No.	Compound	Formula	Retention Time (min)	Molecular Mass	Matching %
1	D-Allothreonine	$C_4H_9NO_3$	2.199	119.12	78.61
2	1,2-Dibutoxyethane	$C_{10}H_{22}O_2$	2.301	174.28	72.18
3	Di-n-propyl ether	$C_6H_{14}O$	2.820	102.17	74.77
4	Amphetamine	$C_9H_{13}N$	3.000	135.21	85.78
5	1-Propanamine, N,2-dimethyl	$C_5H_{13}N$	9.517	87.163	75.23
6	l-Alanine ethylamide	$C_5H_{12}N_2O$	11.211	187.24	81.17
7	1-Octanamine, N-methyl-	$C_9H_{21}N$	15.643	143.26	89.39
8	2-Butanamine, 3-methyl-	$C_5H_{13}N$	20.889	87.16	88.16
9	2-Heptanamine, 5-methyl-	$C_8H_{19}N$	21.634	129.25	77.02
10	Amphetamine-3-methyl	$C_{10}H_{15}N$	25.826	149.23	77.37
11	Benzenemethanol, α-(1-aminoethyl)-	$C_9H_{13}NO$	28.443	151.20	84.43
12	Dibutyl phthalate	$C_{16}H_{22}O_4$	31.827	278.34	87.05