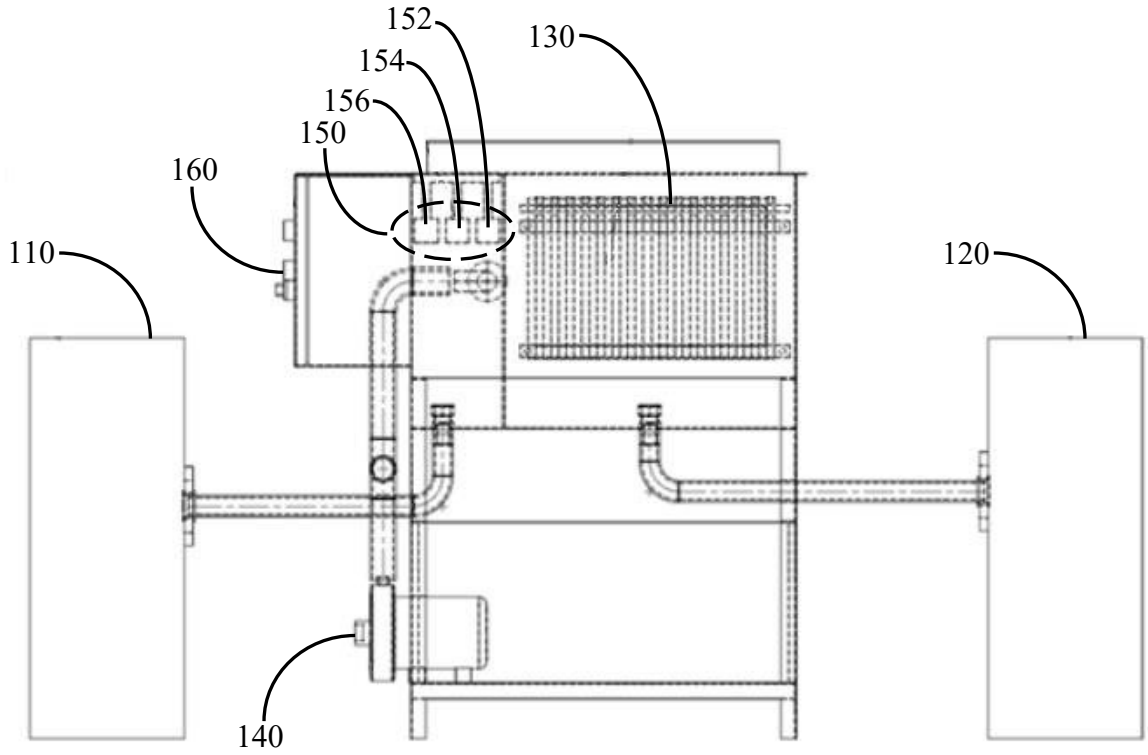


FIG. 1

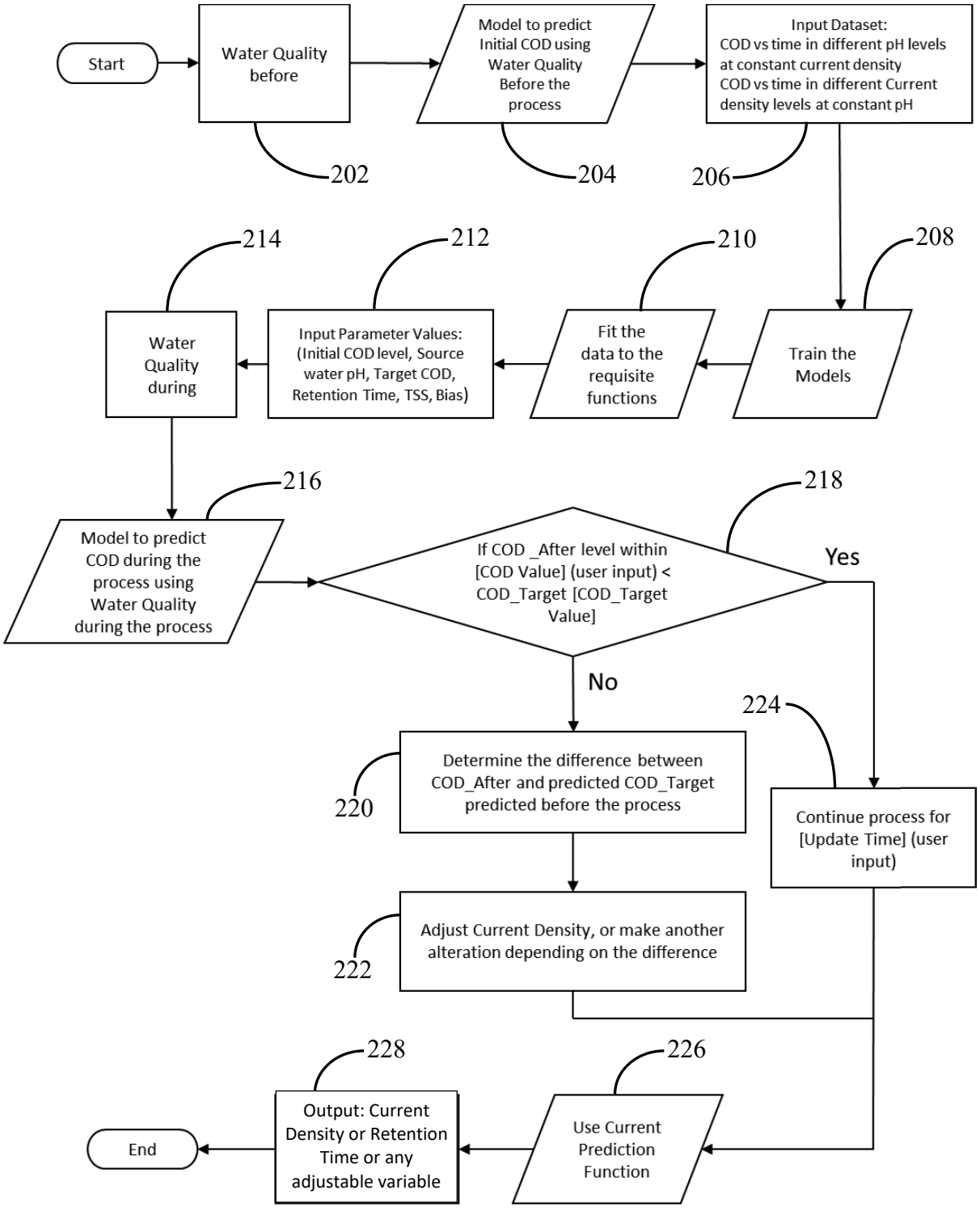

Start
Water Quality before
202
Model to predict Initial COD using Water Quality Before the process
204
Input Dataset:
COD vs time in different pH levels at constant current density
COD vs time in different Current density levels at constant pH
206
208
Train the Models
210
Fit the data to the requisite functions
212
Input Parameter Values: (Initial COD level, Source water pH, Target COD, Retention Time, TSS, Bias)
214
Water Quality during
216
Model to predict COD during the process using Water Quality during the process
218
If COD _After level within [COD Value] (user input) < COD_Target [COD_Target Value]
Yes
No
220
Determine the difference between COD_After and predicted COD_Target predicted before the process
222
Adjust Current Density, or make another alteration depending on the difference
224
Continue process for [Update Time] (user input)
226
Use Current Prediction Function
228
Output: Current Density or Retention Time or any adjustable variable
End
200

FIG. 2

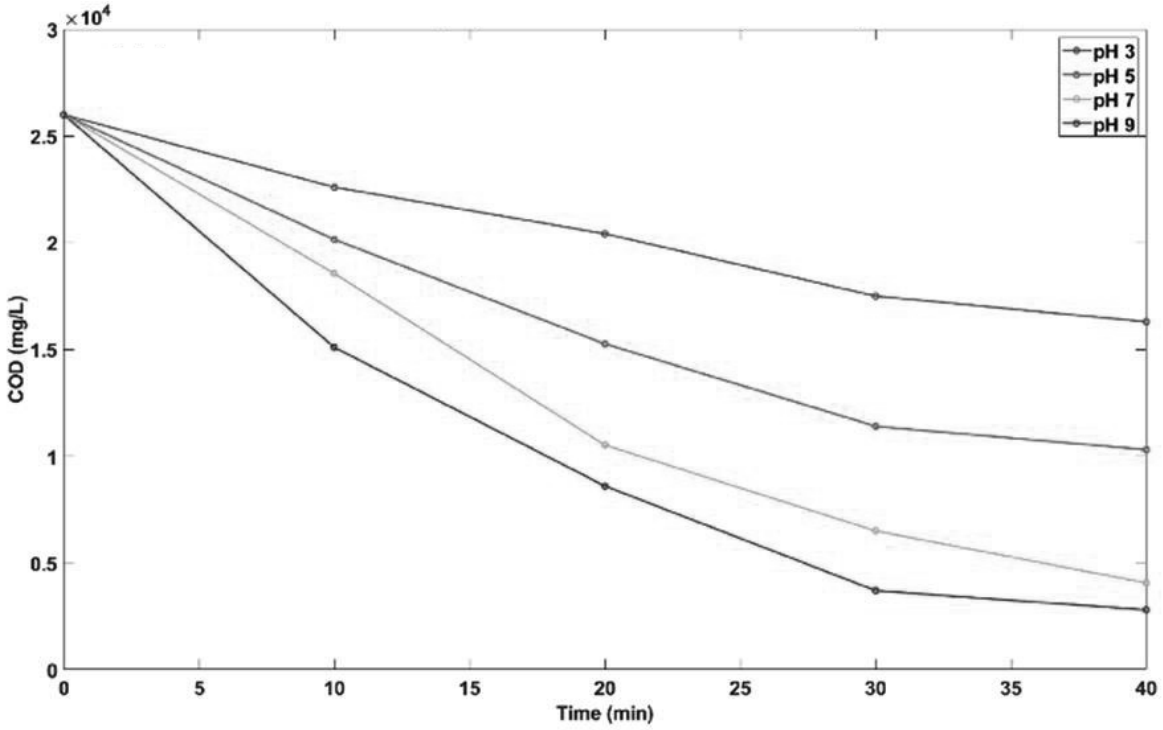

×10^4
3
2.5
2
1.5
1
0.5
0
COD (mg/L)
0
5
10
15
20
25
30
35
40
Time (min)
pH 3
pH 5
pH 7
pH 9

FIG. 3A

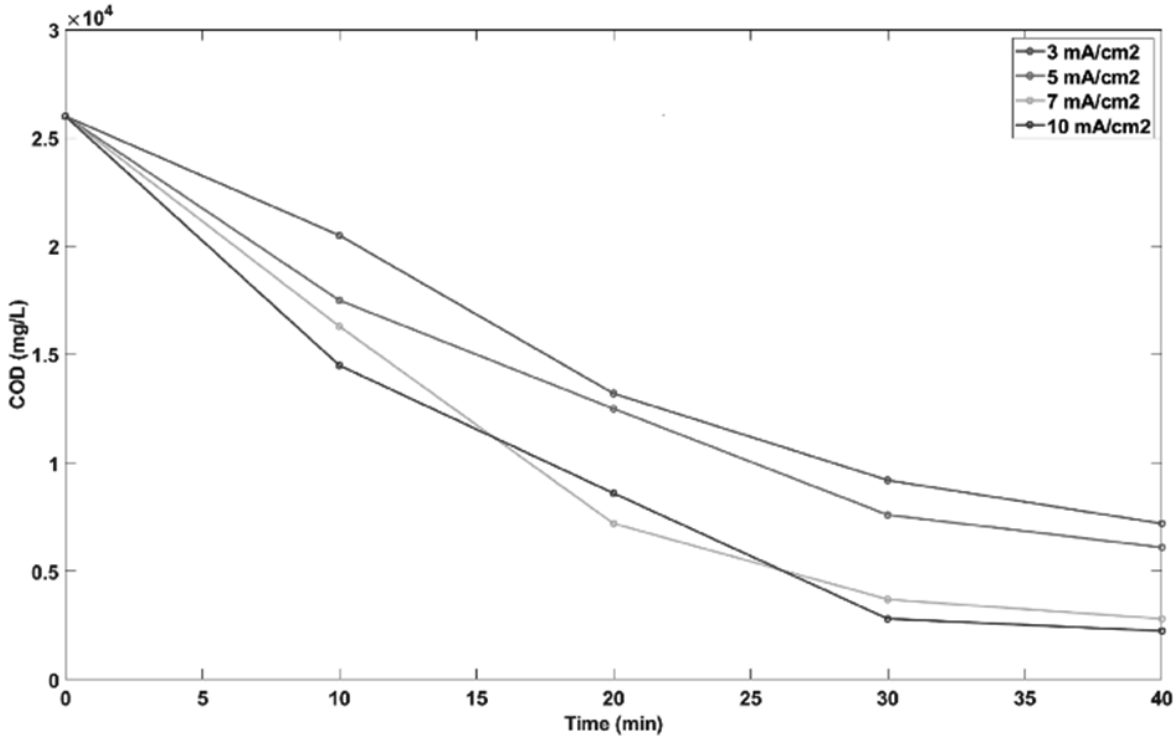

×10^4
3
2.5
2
1.5
1
0.5
0
COD (mg/L)
0
5
10
15
20
25
30
35
40
Time (min)
3 mA/cm2
5 mA/cm2
7 mA/cm2
10 mA/cm2

FIG. 3B

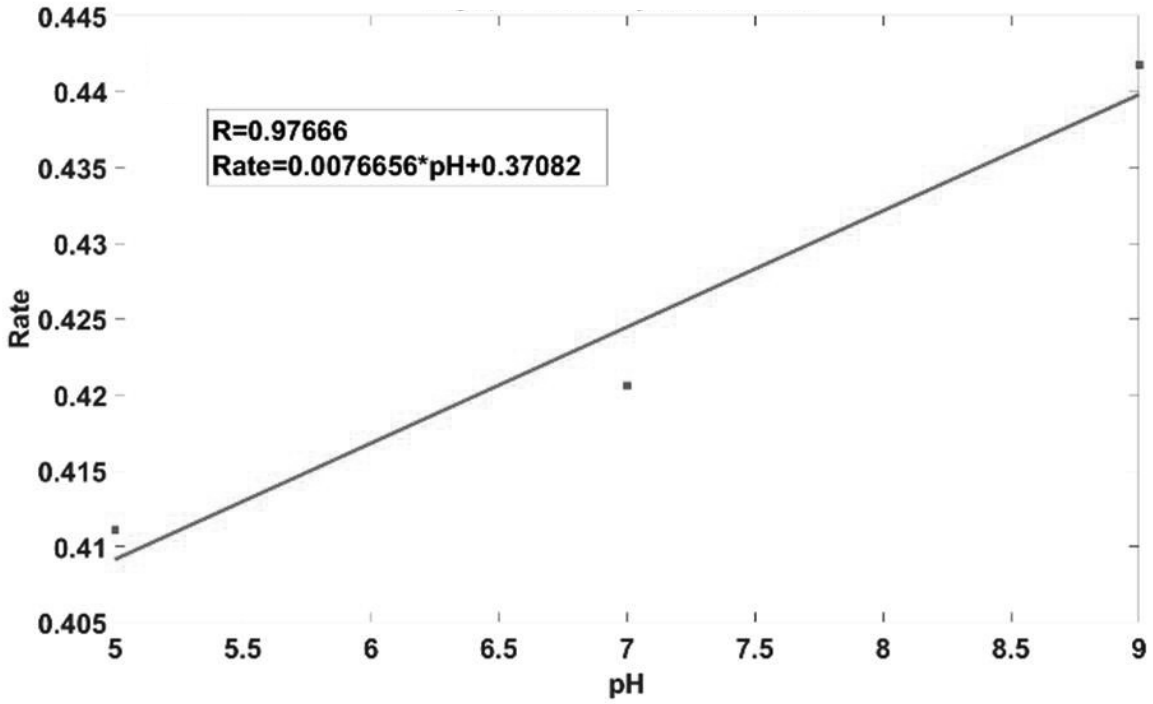

R=0.97666
Rate=0.0076656*pH+0.37082
Rate
pH
0.445
0.44
0.435
0.43
0.425
0.42
0.415
0.41
0.405
5
5.5
6
6.5
7
7.5
8
8.5
9

FIG. 4A

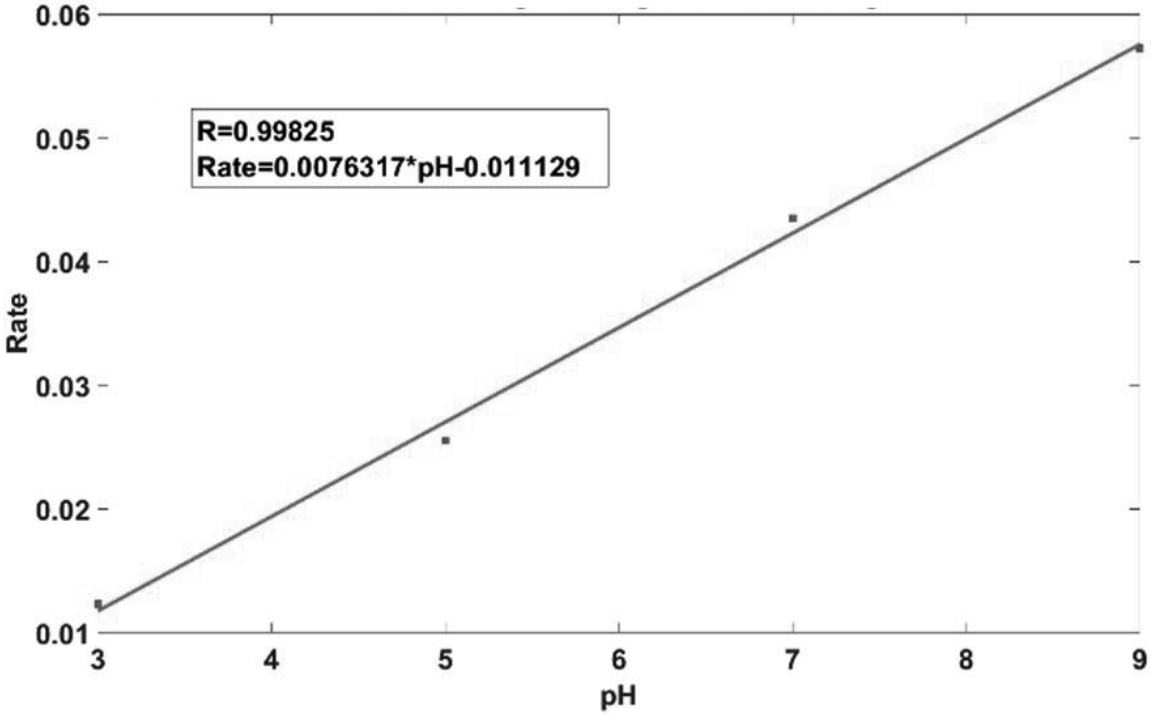

R=0.99825
Rate=0.0076317*pH-0.011129
Rate
pH
0.06
0.05
0.04
0.03
0.02
0.01
3
4
5
6
7
8
9

FIG. 4B

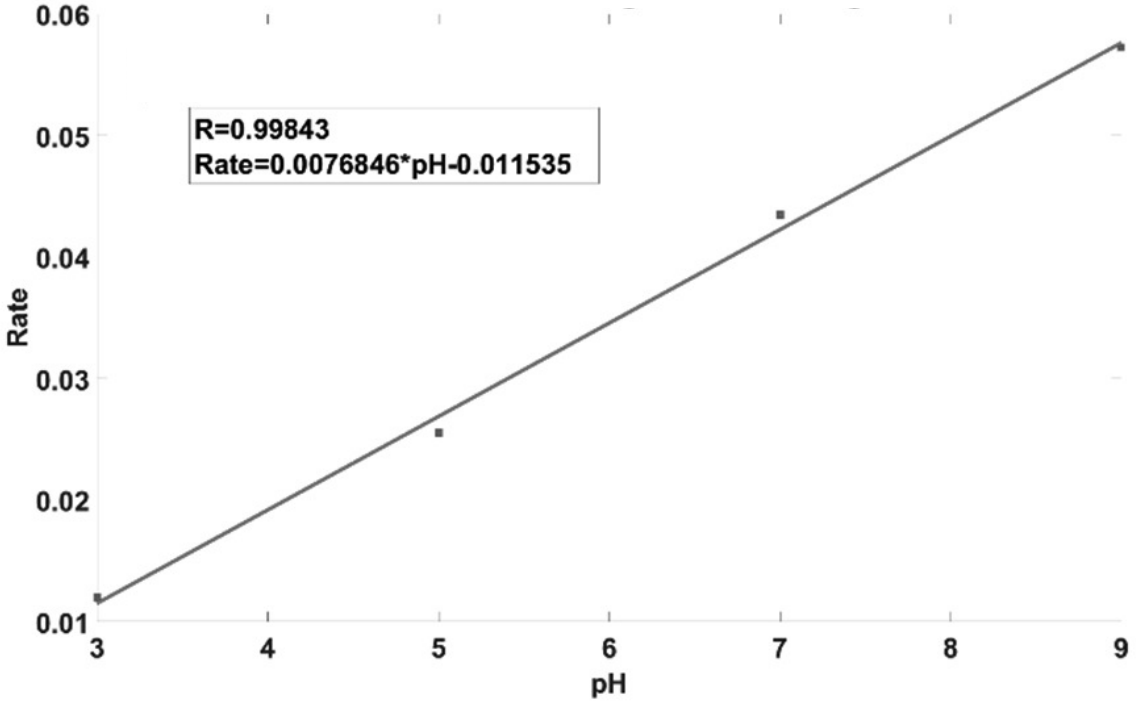

R=0.99843
Rate=0.0076846*pH-0.011535
Rate
pH
0.06
0.05
0.04
0.03
0.02
0.01
3
4
5
6
7
8
9

FIG. 4C

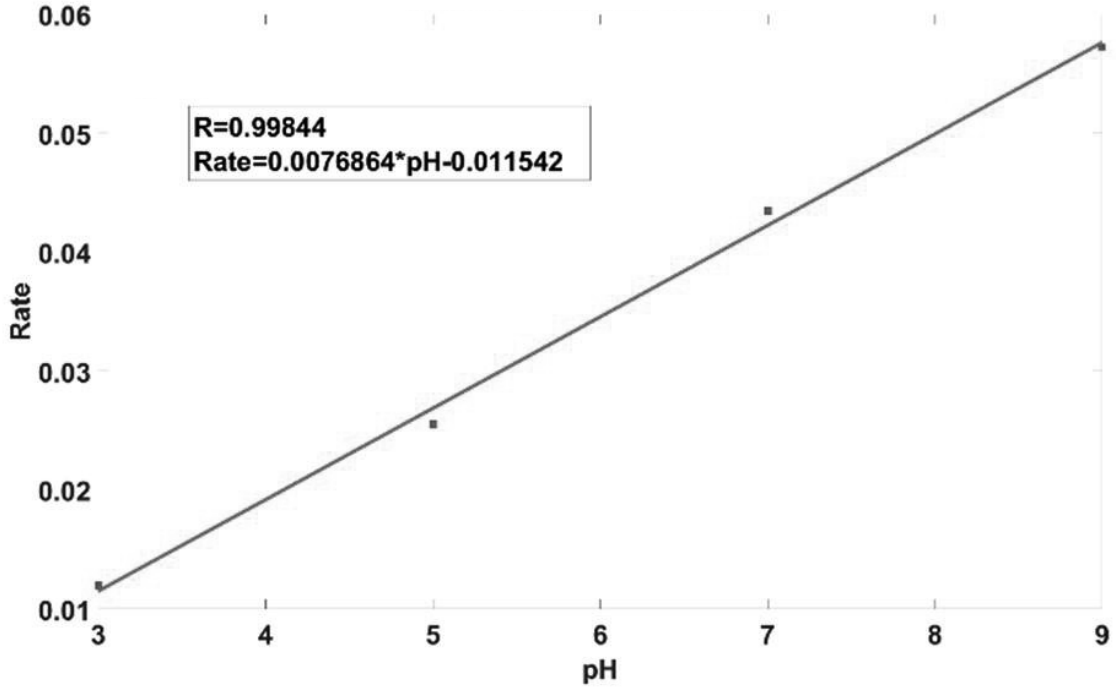

R=0.99844
Rate=0.0076864*pH-0.011542
Rate
pH
0.06
0.05
0.04
0.03
0.02
0.01
3
4
5
6
7
8
9

FIG. 4D

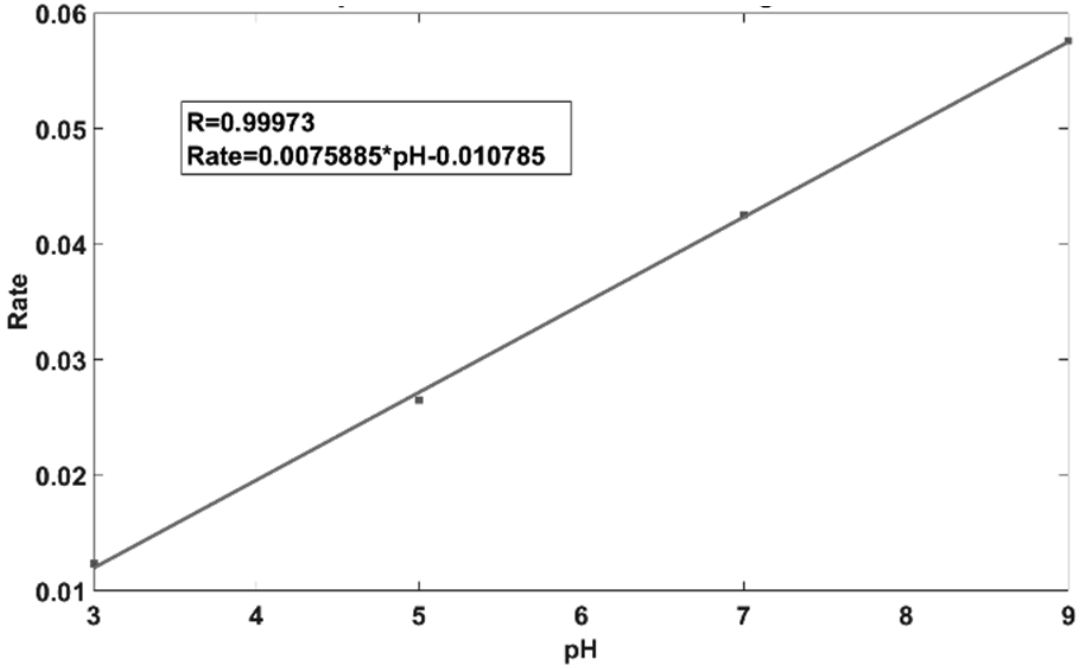

R=0.99973
Rate=0.0075885*pH-0.010785
Rate
pH
0.06
0.05
0.04
0.03
0.02
0.01
3
4
5
6
7
8
9

FIG. 4E

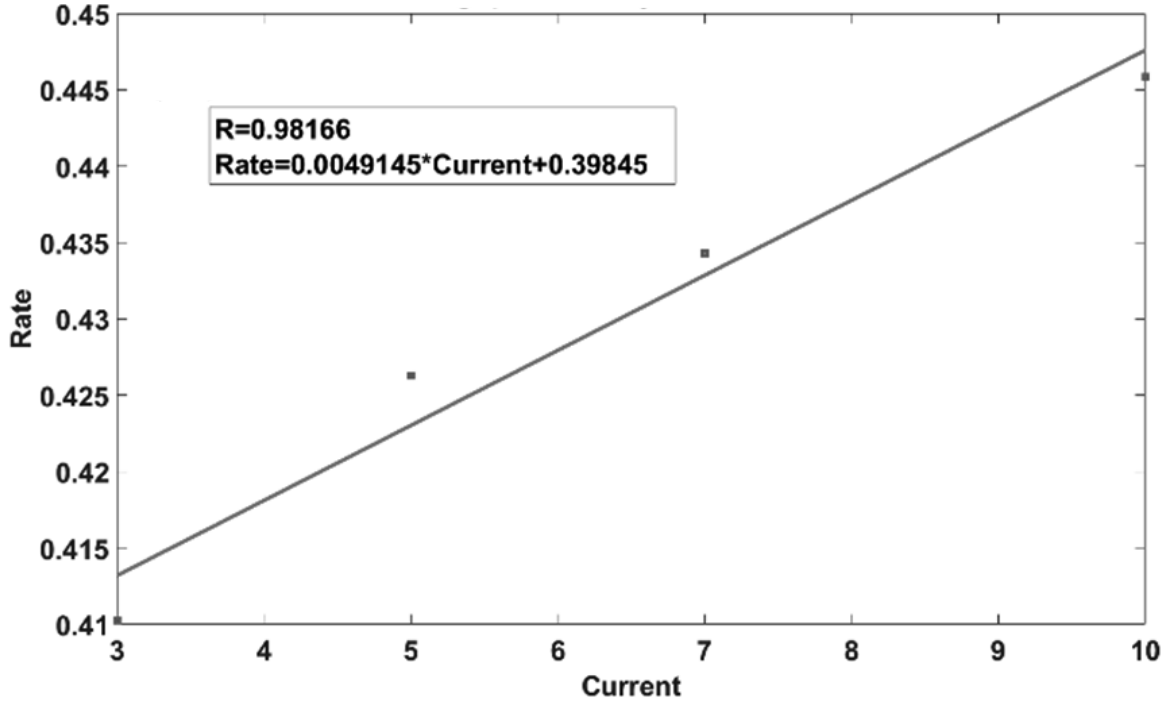

R=0.98166
Rate=0.0049145*Current+0.39845
Rate
Current
0.45
0.445
0.44
0.435
0.43
0.425
0.42
0.415
0.41
3
4
5
6
7
8
9
10

FIG. 5A

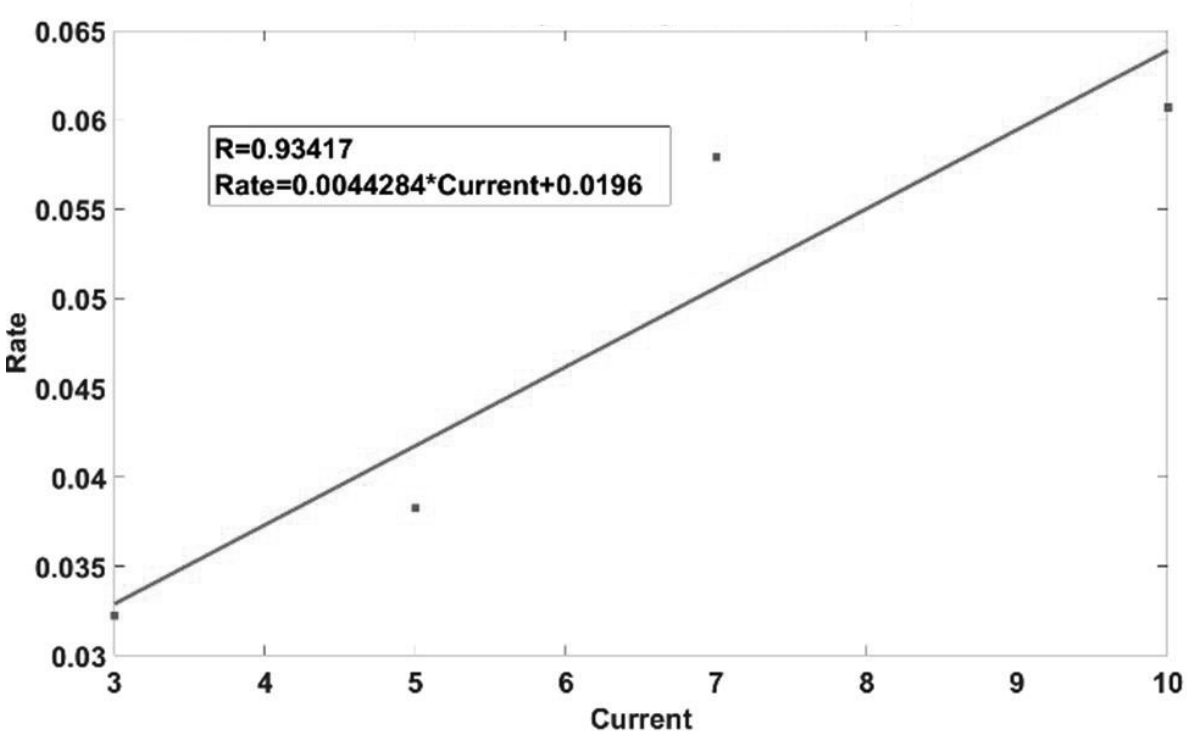

R=0.93417
Rate=0.0044284*Current+0.0196
Rate
Current
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
3
4
5
6
7
8
9
10

FIG. 5B

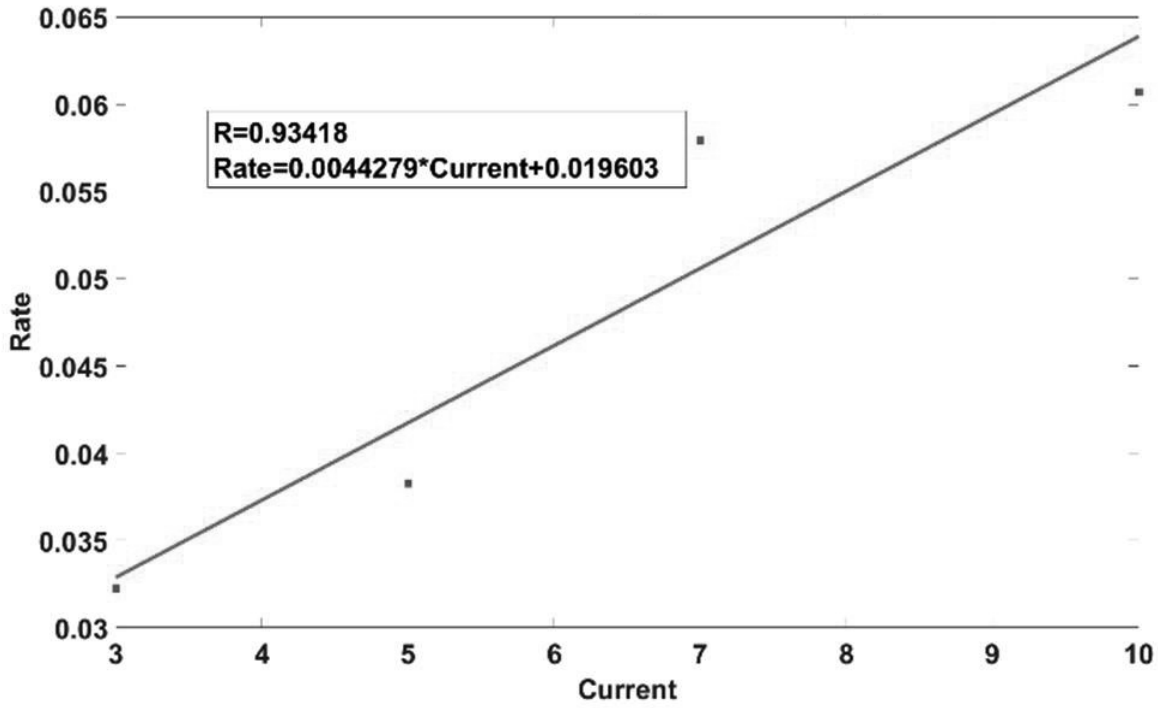

R=0.93418
Rate=0.0044279*Current+0.019603
Rate
Current
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
3
4
5
6
7
8
9
10

FIG. 5C

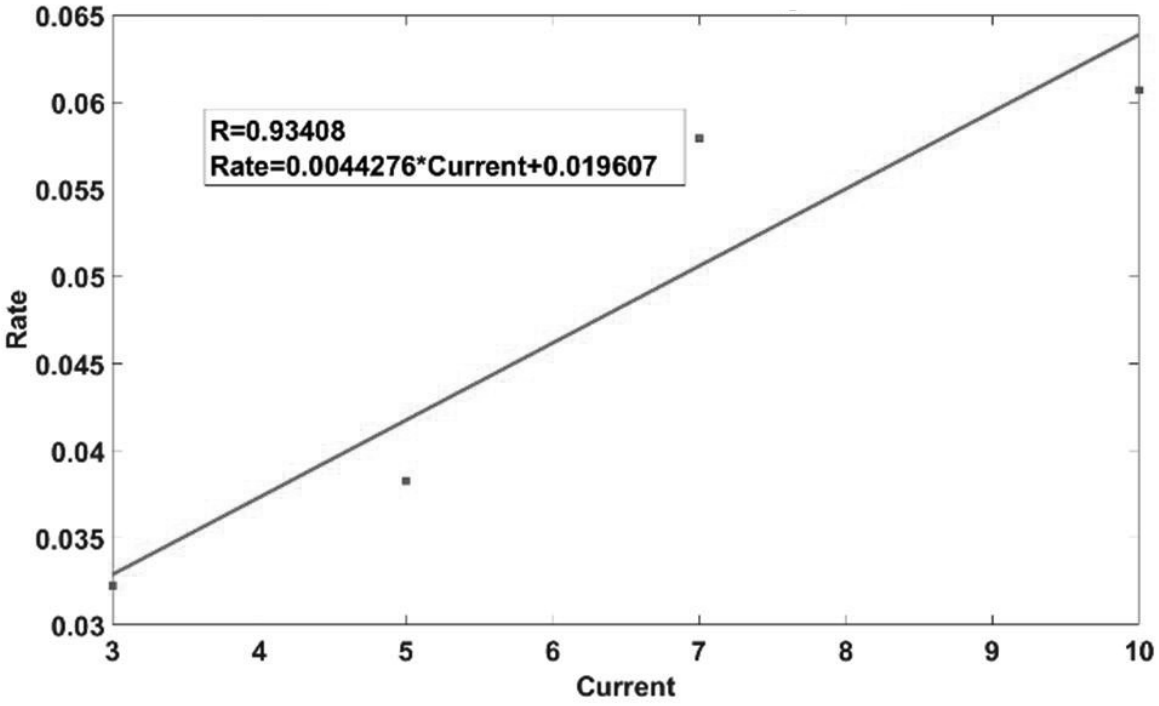

R=0.93408
Rate=0.0044276*Current+0.019607
Rate
Current
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
3
4
5
6
7
8
9
10

FIG. 5D

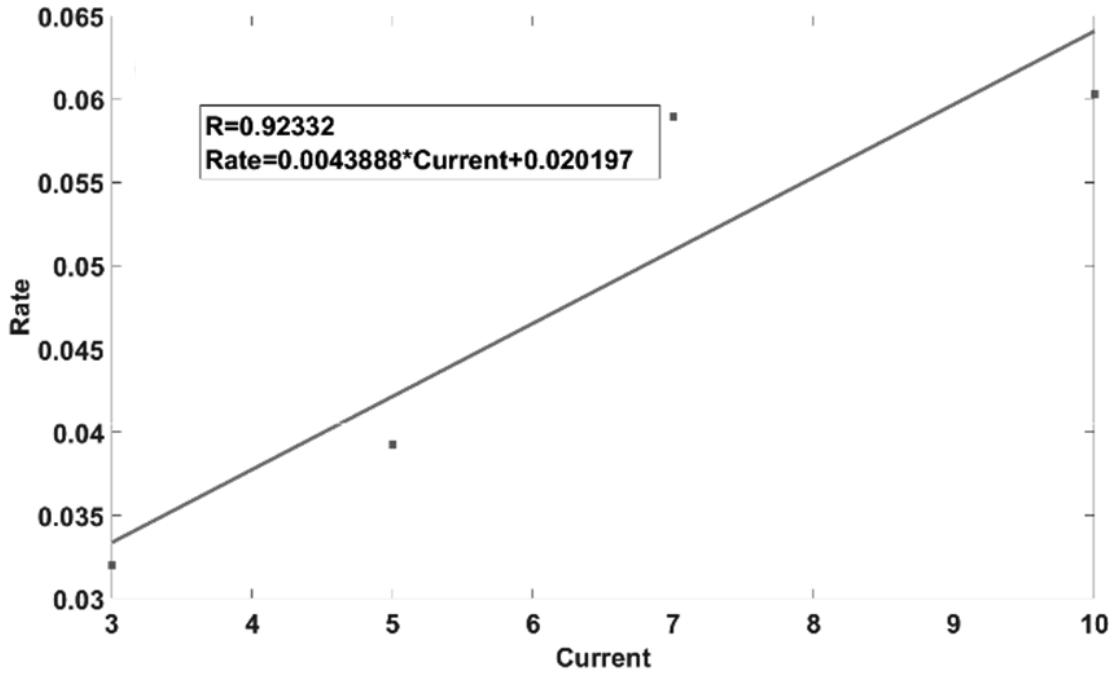

R=0.92332
Rate=0.0043888*Current+0.020197
Rate
Current
0.065
0.06
0.055
0.05
0.045
0.04
0.035
0.03
3
4
5
6
7
8
9
10

FIG. 5E

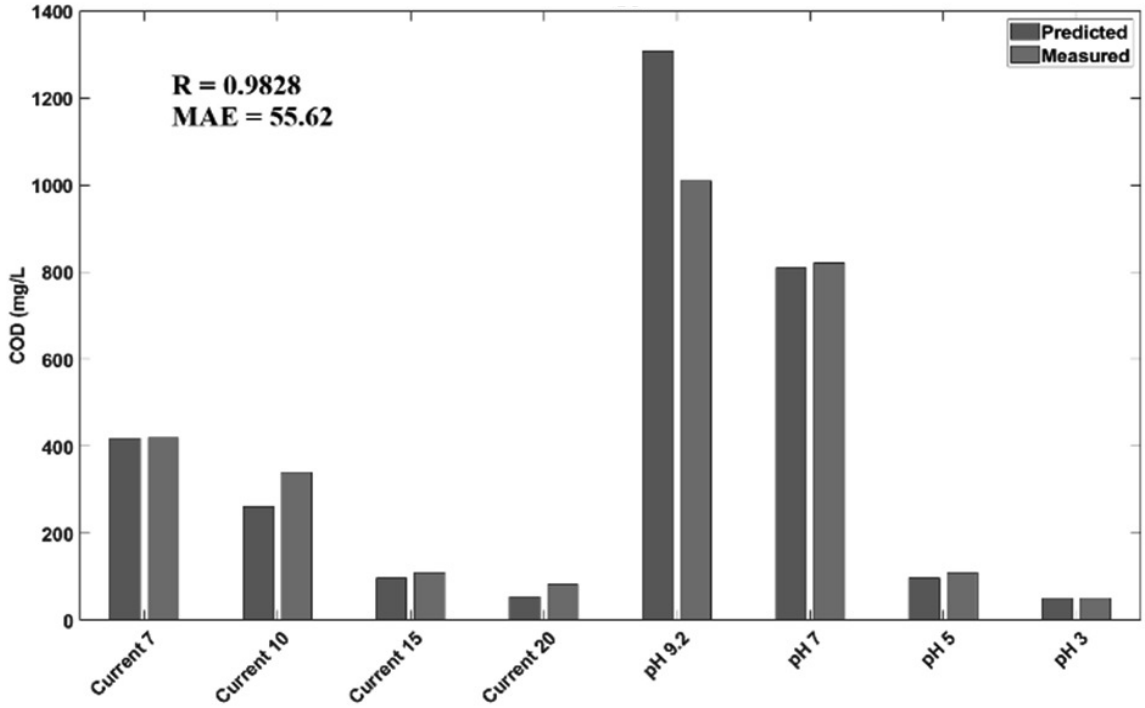

R = 0.9828
MAE = 55.62
Predicted
Measured
COD (mg/L
0
200
400
600
800
1000
1200
1400
Current 7
Current 10
Current 15
Current 20
pH 9.2
pH 7
pH 5
pH 3

FIG. 6A

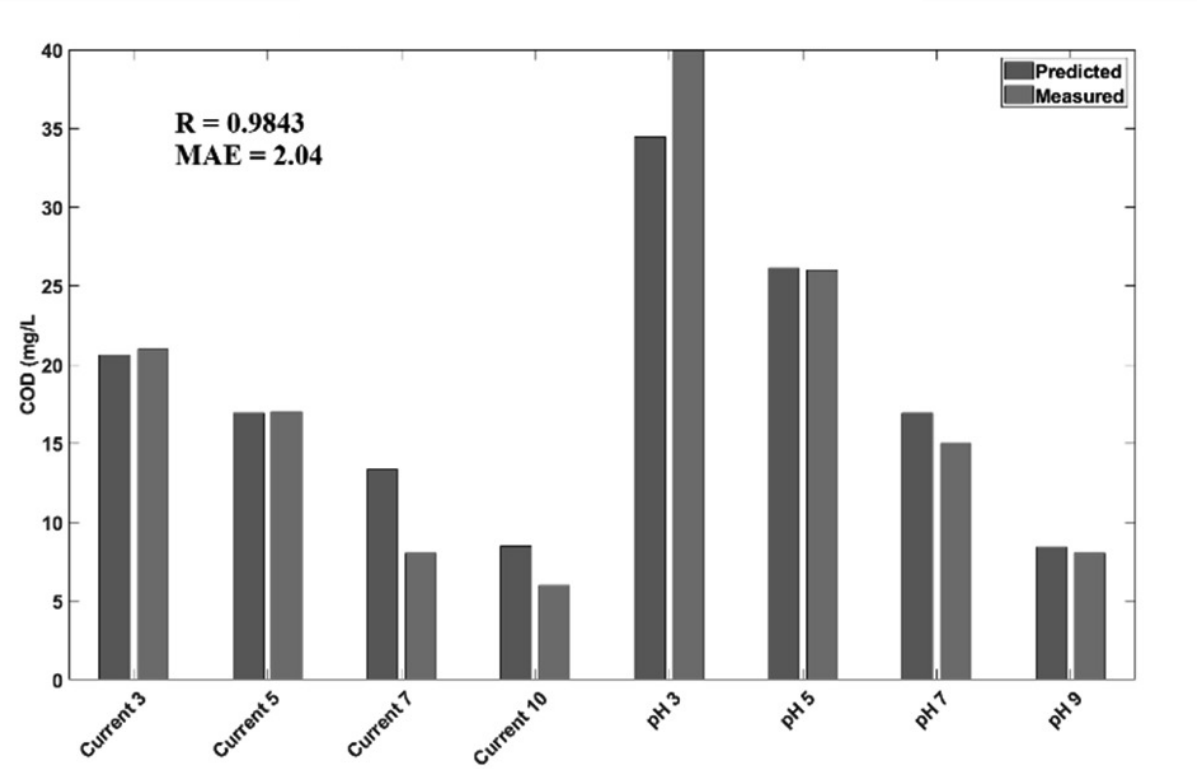

R = 0.9843
MAE = 2.04
Predicted
Measured
COD (mg/L
0
5
10
15
20
25
30
35
40
Current 3
Current 5
Current 7
Current 10
pH 3
pH 5
pH 7
pH 9

FIG. 6B

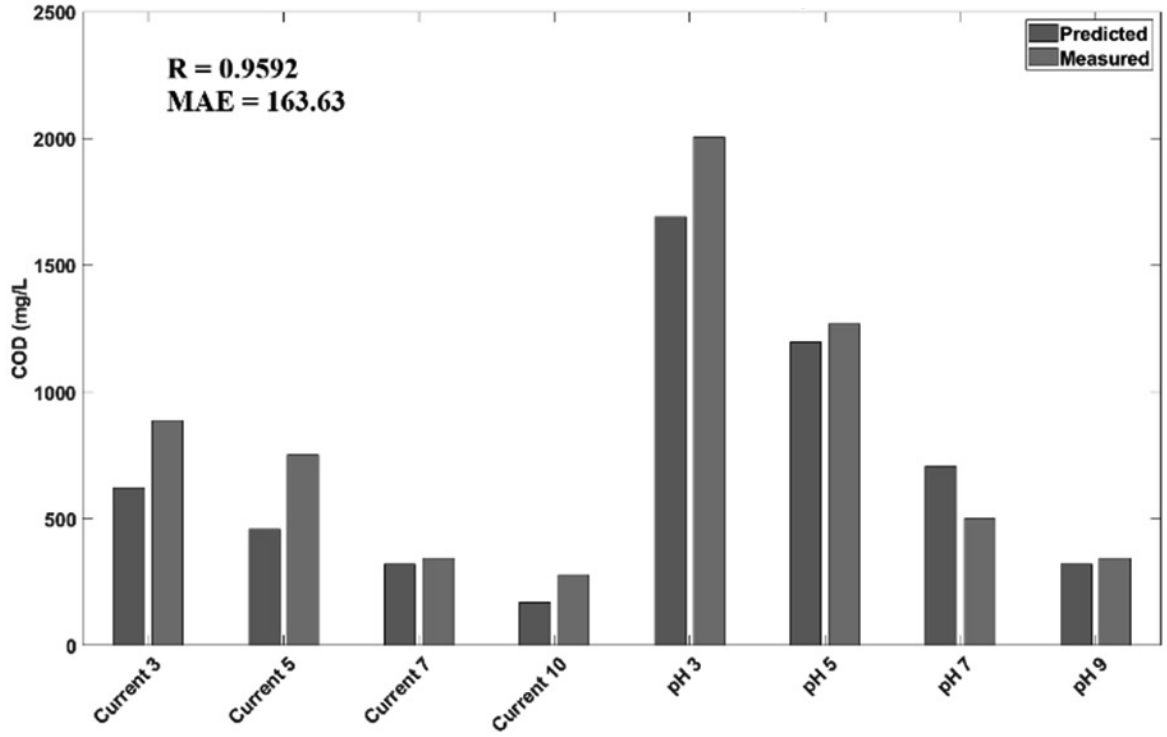

R = 0.9592
MAE = 163.63
Predicted
Measured
COD (mg/L
2500
2000
1500
1000
500
0
Current 3
Current 5
Current 7
Current 10
pH 3
pH 5
pH 7
pH 9

FIG. 6C

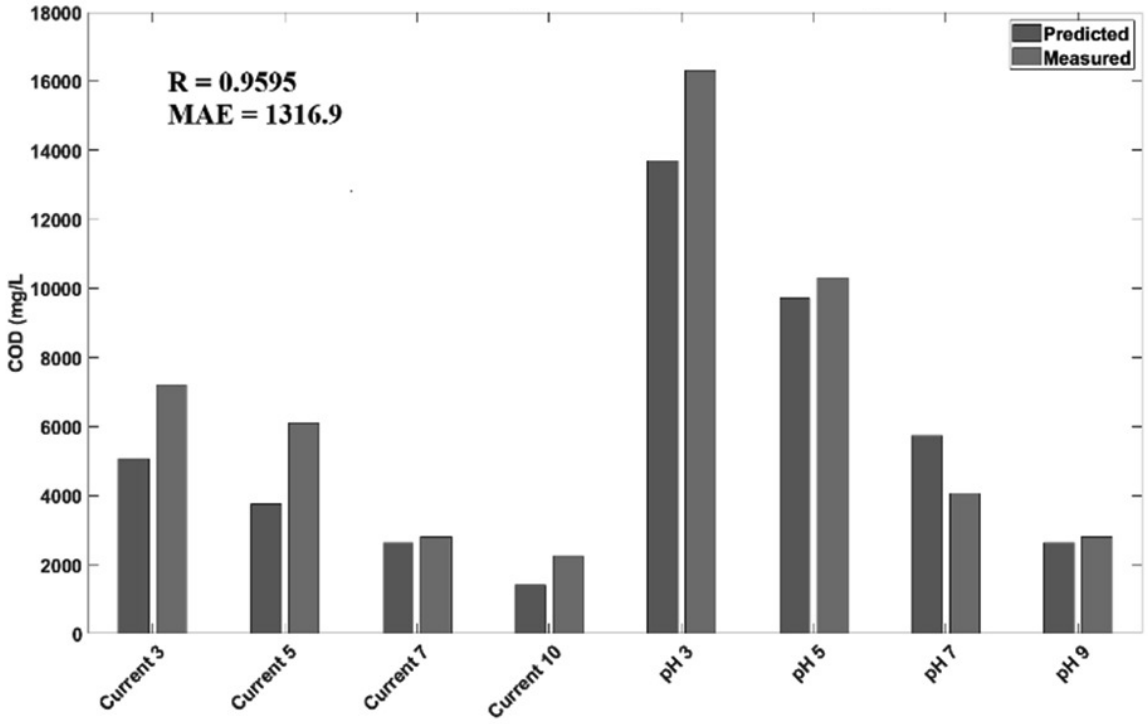

R = 0.9595
MAE = 1316.9
Predicted
Measured
COD (mg/L
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Current 3
Current 5
Current 7
Current 10
pH 3
pH 5
pH 7
pH 9

FIG. 6D

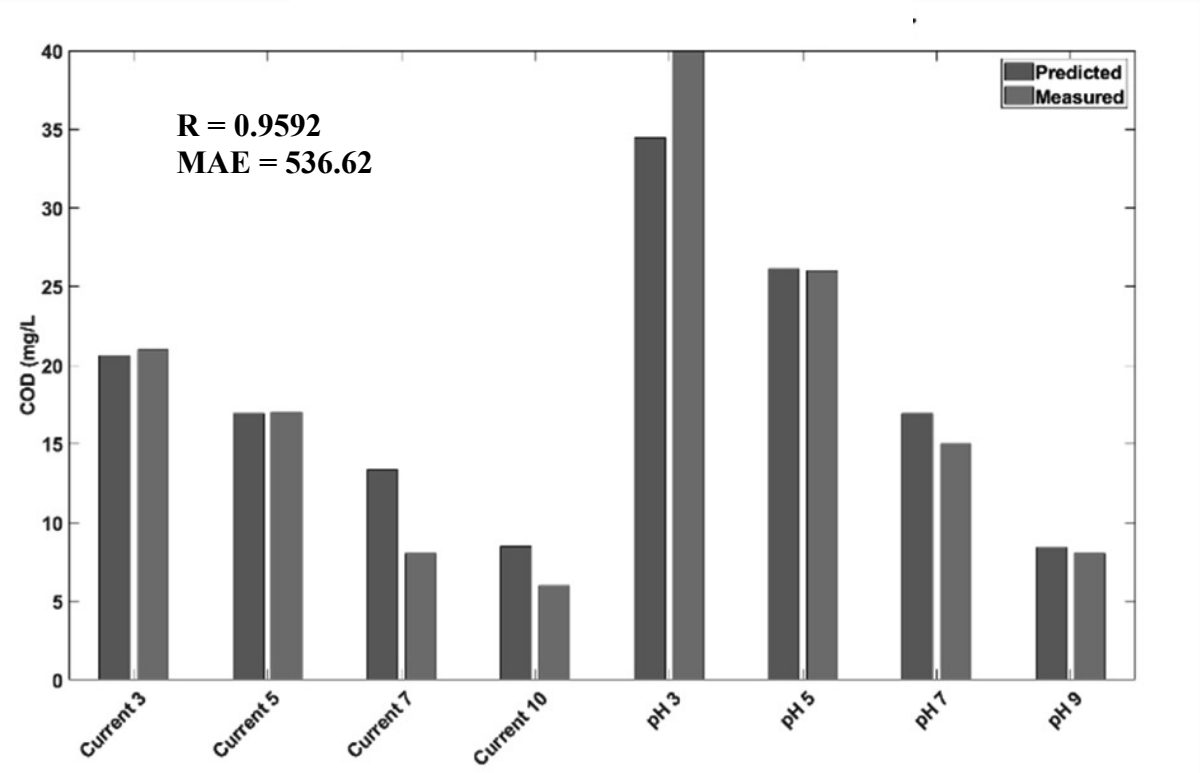

R = 0.9592
MAE = 536.62
Predicted
Measured
COD (mg/L
0
5
10
15
20
25
30
35
40
Current 3
Current 5
Current 7
Current 10
pH 3
pH 5
pH 7
pH 9

FIG. 6E