

# Supplementary Materials: Optimization of Stripping Voltammetric Sensor by a Back Propagation Artificial Neural Network for the Accurate Determination of Pb(II) in the Presence of Cd(II)

Guo Zhao, Hui Wang, Gang Liu and Zhiqiang Wang

Table S1. Experimental design and results of the training dataset.

No.	Stripping Peak Current		Concentration ( $\mu\text{g/L}$ )		Artificial Neural Network Modelling ( $\mu\text{g/L}$ )	Absolute Error ( $\mu\text{g/L}$ )	Relative Error (%)
	Cd(II)	Pb(II)	Cd(II)	Pb(II)	Pb(II)		
1	2.688	2.44	5	5	5.317	0.317	6.34
2	6.51	39.27	10	110	107.197	2.803	2.5482
3	11.53	2.134	20	1	1.138	0.138	13.80
4	40.64	2.234	70	1	1.13	0.130	130
5	7.246	2.143	10	1	2.195	1.195	119.50
6	24.96	5.785	40	20	19.522	0.478	2.390
7	2.114	3.556	1	10	10.075	0.075	0.750
8	43.69	3.81	70	10	10.519	0.519	5.190
9	2.954	10.23	5	40	39.067	0.933	2.333
10	2.722	18.28	5	70	69.469	0.531	0.759
11	78.41	30.68	110	70	69.911	0.089	0.127
12	1.953	1.964	1	1	1.023	0.023	2.30
13	43.24	2.819	70	5	5.341	0.341	6.820
14	44.86	6.124	70	20	21.625	1.625	8.125
15	3.116	5.664	5	20	19.276	0.724	3.620
16	12.75	2.921	20	5	5.174	0.174	3.480
17	24.66	3.595	40	10	9.669	0.331	3.310
18	1.953	42.12	1	110	110.695	0.695	0.632
19	12.73	12.04	20	40	39.668	0.332	0.830
20	2.685	33.99	5	110	109.472	0.528	0.480
21	28.24	39.21	40	110	110.252	0.252	0.229
22	2.885	3.339	5	10	9.94	0.060	0.60
23	44.84	11.26	70	40	35.037	4.963	12.408
24	50.53	38.5	70	110	110.759	0.759	0.690
25	6.85	3.542	10	10	9.595	0.405	4.050
26	76.56	2.778	110	5	6.879	1.879	37.58
27	46.91	22.5	70	70	68.59	1.410	2.014
28	10.31	3.589	20	10	9.537	0.463	4.630
29	25.19	2.701	40	5	6.249	1.249	24.980

Table S1. Cont.

No.	Stripping Peak		Concentration		Artificial Neural	Absolute Error ( $\mu\text{g/L}$ )	Relative Error (%)
	Current		( $\mu\text{g/L}$ )		Network Modelling		
	Cd(II)	Pb(II)	Cd(II)	Pb(II)	( $\mu\text{g/L}$ ) Pb(II)		
30	1.968	2.468	1	5	5.467	0.467	9.340
31	2.595	2.017	5	1	1.867	0.867	86.70
32	6.991	2.599	10	5	5.659	0.659	13.180
33	34.59	15.03	40	40	42.43	2.430	6.075
34	73.74	6.451	110	20	19.512	0.488	2.440
35	6.378	22.51	10	70	71.327	1.327	1.896
36	14.12	6.913	20	20	22.37	2.370	11.850
37	73.59	42.1	110	110	109.034	0.966	0.878

Table S2. Experimental design and results of the testing dataset.

No.	Stripping Peak		Concentration		Artificial Neural	Absolute Error ( $\mu\text{g/L}$ )	Relative Error (%)
	Current		( $\mu\text{g/L}$ )		Network Modelling		
	Cd(II)	Pb(II)	Cd(II)	Pb(II)	( $\mu\text{g/L}$ ) Pb(II)		
1	74.03	2.057	110	1	2.165	1.165	116.5
2	2.032	12.05	1	40	41.327	1.327	3.318
3	2.074	5.875	1	20	18.358	1.642	8.210
4	74	3.832	110	10	9.012	0.988	9.880
5	75.16	14.02	110	40	42.337	2.337	5.843
6	32.52	2.084	40	1	2.858	1.858	185.8
7	6.668	5.676	10	20	18.827	1.173	5.865
8	6.541	11.56	10	40	39.129	0.871	2.178
9	17.08	48.35	20	110	111.753	1.753	1.594
10	27.51	22.49	40	70	72.312	2.312	3.303
11	2.006	25.31	1	70	70.226	0.226	0.323
12	16.36	28.43	20	70	72.611	2.611	3.730