

**Supplementary Information for**

**Treatment of crude oil contaminated wastewater via an electrochemical reaction**

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## Supplementary figures

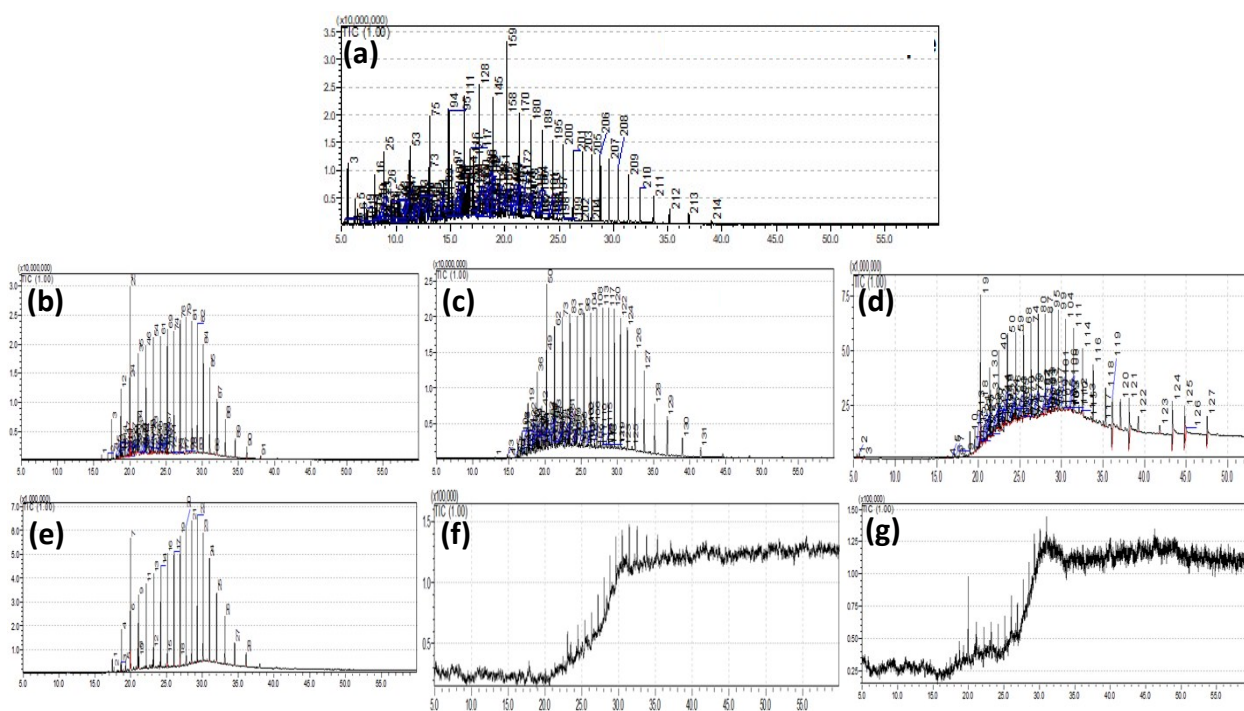


Fig 1: GCMS Chromatogram of (a): untreated sample, (b): hydrocarbons adsorbed by ZnO NPs (produced at 9 volt), (c): hydrocarbons adsorbed by ZnO NPs (produced at 12 volt), (d): hydrocarbons adsorbed by ZnO NPs (produced at 15 volt), (e): treated sample (by 9 volt), (f): treated sample (by 12 volt), (g): treated sample (by 15 volt)

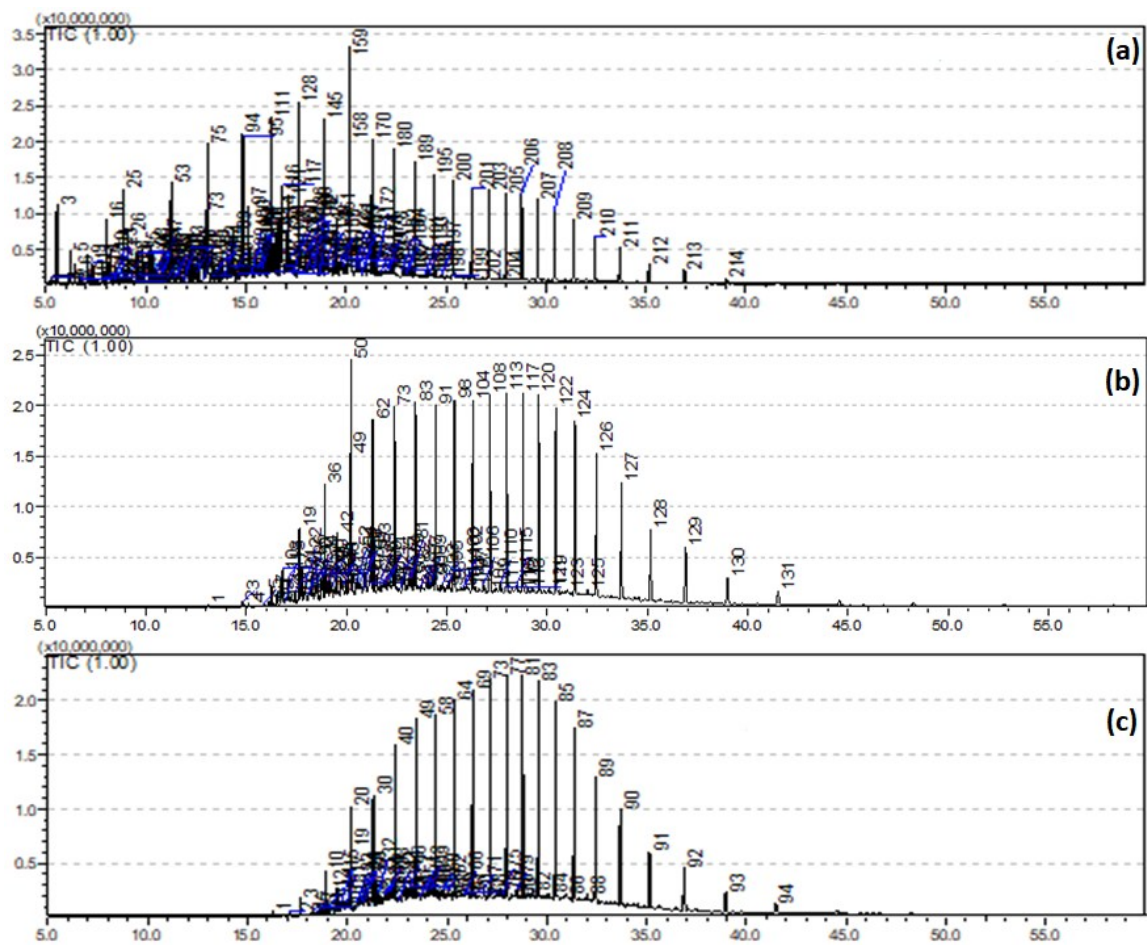


Fig. 2: GCMS Chromatogram of (a) Untreated formation water sample, (b) Petroleum hydrocarbons adsorbed/absorbed by ZnO NPs and (c) Petroleum hydrocarbons adsorbed/absorbed by reused ZnO NPs of reactions taking place at 12 volts.

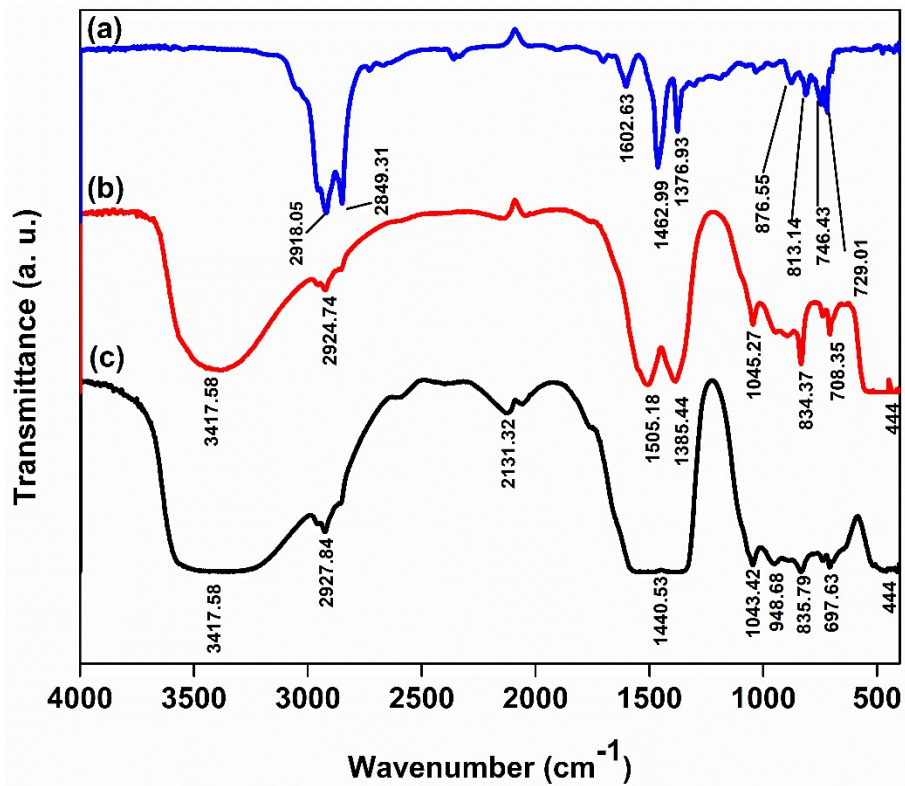


Fig 3. FTIR spectra of (a) Crude oil extracted from formation water, (b) ZnO NP with adsorbed petroleum HC and (c) Reused ZnO NPs with adsorbed petroleum hydrocarbon.

## Supplementary Tables:

Table1: Types of aromatic hydrocarbons present in the untreated formation water sample.

Sl. No	Name or type	Total no. of compound	peak no/Retention time(in min)
1	Derivatives of Benzene	27	2/5.29, 3/5.546, 5/6.204, 14/7.85, 16/8.046, 22/8.5, 25/8.89, 27/9.216, 28/9.266, 31/9.505, 32/9.558, 37/10.135, 39/10.344, 41/10.468, 48/10.936, 49/10.985, 54/11.354, 57/11.558, 58/11.598, 59/11.67, 65/12.263, 80/13.544, 81/13.625, 84/13.932, 93/14.656, 113/16.479
2	Derivatives of Naphthalene	14	73/12.955, 95/14.868, 103/15.58, 112/16.37, 116/16.756, 117/16.821, 120/17.055, 129/17.708, 132/17.93, 134/18.062, 137/18.303, 140/18.505, 148/19.158, 173/21.676
3	1,1'-Bicyclopentyl	1	41/10.468
4	Bicyclo[4.2.1]nona-2,4,7-triene, 7-ethyl-	1	82/13.76
5	Phenol, 3,6-difluoro-2-methoxy-	1	98/15.185
6	8,9-Dimethylbicyclo[4.4.1]undeca-2,4,8-triene	1	106/15.789
7	2-(4-Pentenyl)-6-pentylpiperidine	1	110/16.125
8	3-Cyclohepten-1-ol, 3-phenyl-	1	133/17.985
9	Pyridinium, 1-hexadecyl-, chloride, monohydrate	1	139/18.454

10	1,1'-Biphenyl, 3,4'-dimethyl-	1	146/18.99
11	Chamazulene	1	157/20.077
12	4a,9a-Methano-9H-fluorene	1	161/20.472
13	9H-Fluorene, 9-methyl-	1	162/20.575
14	Phenanthrene	1	172/21.541
15	1,1'-biphenyl, 4-(1-azido-1-methylethyl)-	1	175/21.852
16	1,1'-Bicyclopentyl	1	41/10.468
17	[14]Annulene, 1,6:7,12-bis(methano)-, anti-	1	191/23.95
18	Phenanthrene derivative	3	182/22.809, 185/23.086, 194/24.215

Table 2: Types of aromatic hydrocarbons adsorbed by ZnO nanoparticles

Serial No.	Name or type	Total number of compounds	Peak number/ Retention time
1	Derivatives of Naphthalene	10	3/14.864, 8/16.365, 14/17.055, 20/17.711, 22/17.932, 24/18.065, 27/18.214, 31/18.507, 39/19.16, 65/21.679
2	3-Cyclohepten-1-ol, 3-phenyl-	1	23/17.985
3	1,1'-Biphenyl, 3,4'-dimethyl-	1	37/18.993
4	Chamazulene	1	48/20.079

5	4a,9a-Methano-9H-fluorene	1	52/20.473
6	9H-Fluorene, 9-methyl-	1	53/20.577
7	Phenanthrene	1	64/21.543
8	Derivatives of phenanthrene	3	76/22.81, 79/23.088, 90/24.261