

Supplementary Data

Synergistic adsorption-photocatalytic remediation of methylene blue dye from textile industry wastewater over NiFe LDH supported on tyre-ash derived activated carbon

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Experimental results

Table S1 2⁴ central composite design experimental setup for optimization of parameters

Experiment	MC (mg)	DT (min)	Conc (mg/L)	pH	Degradation (%)
1	5	10	10	3	19.64
2	5	10	10	10	33.35
3	5	10	50	3	14.85
4	5	10	50	10	22.06
5	5	50	10	3	28.25
6	5	50	10	10	50.70
7	5	50	50	3	22.72
8	5	50	50	10	90.95
9	50	10	10	3	59.66
10	50	10	10	10	66.89
11	50	10	50	3	37.40
12	50	10	50	10	41.64
13	50	50	10	3	51.23
14	50	50	10	10	42.16

15	50	50	50	3	38.21
16	50	50	50	10	75.19
17	-5.86	30	30	6.5	4.05
18	60.9	30	30	6.5	94.99
19	27.5	2.28	30	6.5	24.45
20	27.5	71.7	30	6.5	94.42
21	27.5	30	0.35	6.5	30.75
22	27.5	30	59.6	6.5	31.38
23	27.5	30	30	1.31	31.58
24	27.5	30	30	11.7	65.02
25 (C)	27.5	30	30	6.5	24.14
26 (C)	27.5	30	30	6.5	23.19

Table S2 Comparison of the performance of the NiFe LDH/AC with other materials in the degradation of MB

Photocatalysts	MB concentration (ppm)	Catalyst load (mg)	Reaction time (min)	Degradation (%)	Ref
NiO/g-C ₃ N ₄	10	100	90	91.6	[1]
Mn ₃ O ₄ - γ -MnS	15	20	70	91.2	[2]
Cu _{0.5} Co _{0.5} WO ₄ /g-C ₃ N ₄	10	100	120	93.4	[3]
MgAlTi-LDH/g-C ₃ N ₄	20	20	1120	95	[4]
NiFe-LDH/Cu ₂ O	6	50	240	93.0	[5]
MgCr-LDH	20	30	120	90.6	[6]
Co-Al LDH/GO	10	100	60	71.0	[7]
Bi ₅ O ₇ I/ NiFe-LDH	10	50	240	81.2	[8]
NiAl LDH/CuWO ₄	10	100	300	87.5	[9]
NiFe LDH/AC	30	30	30	94.2	This work

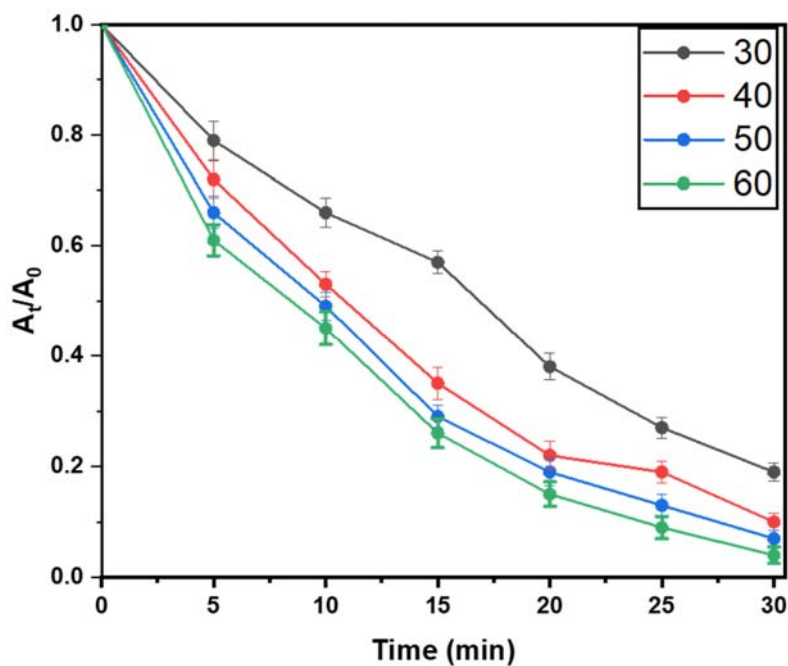


Fig. S1 Temperature optimization towards the photodegradation of MB using NiFe LDH/AC

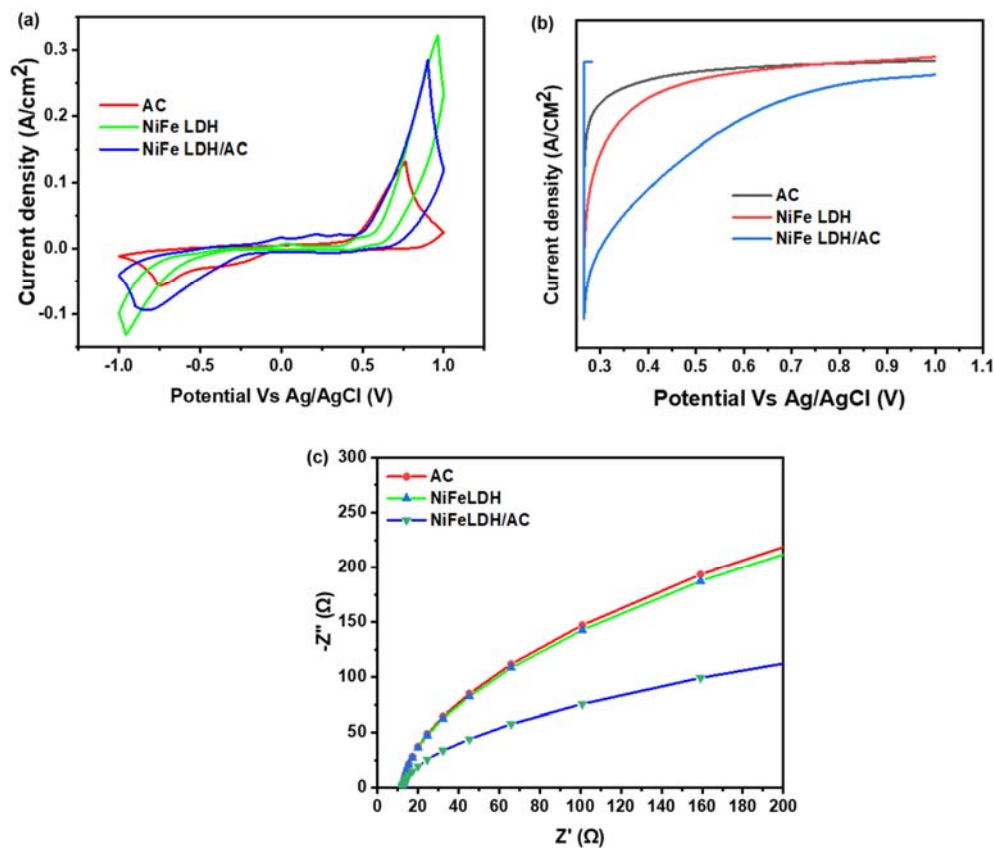


Fig. S2 Electrochemical responses: (a), CV curves, (b) Current density, and (c) LSV transient photocurrent responses of AC, NiFe LDH, and NiFe LDH/AC nanocomposites

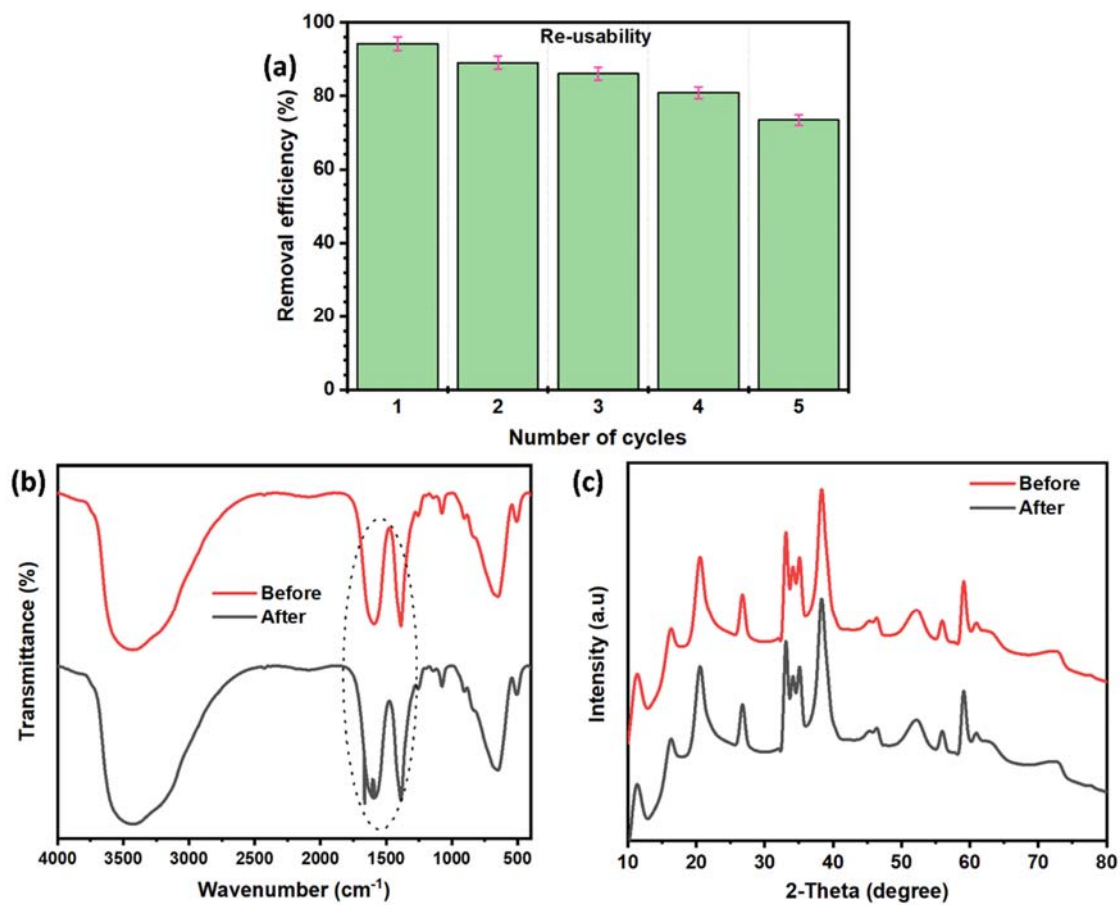
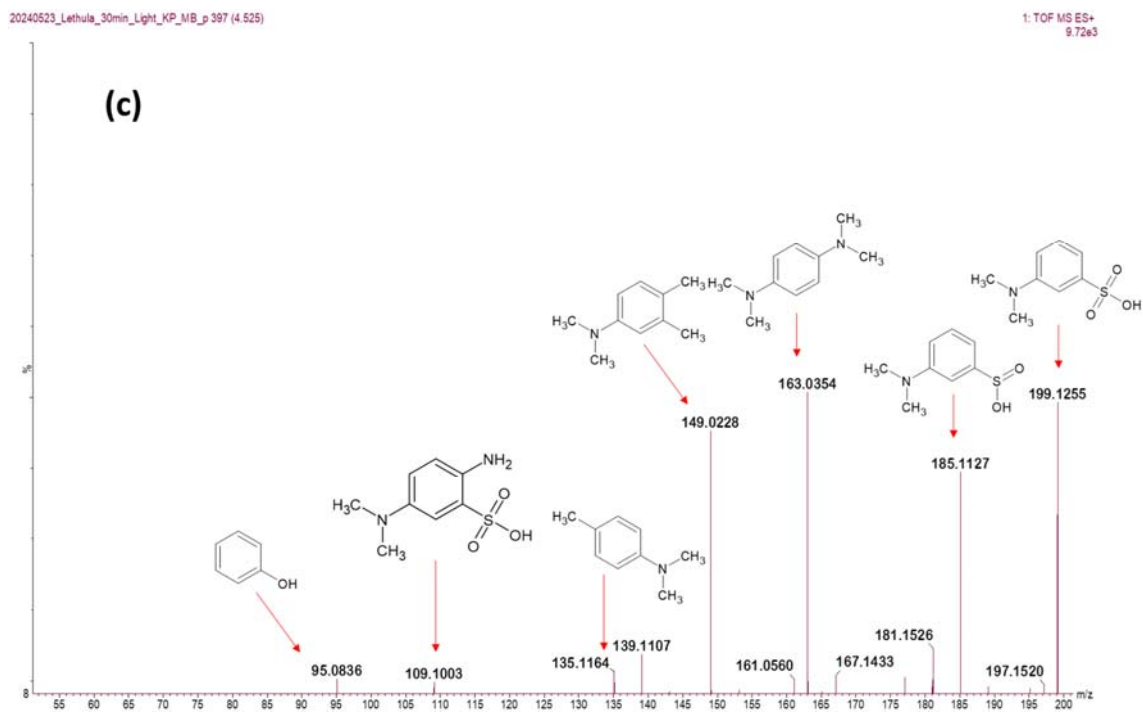
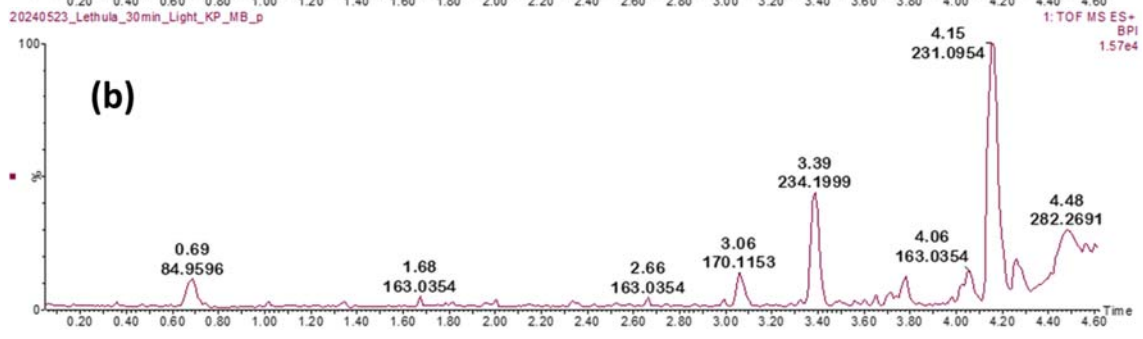
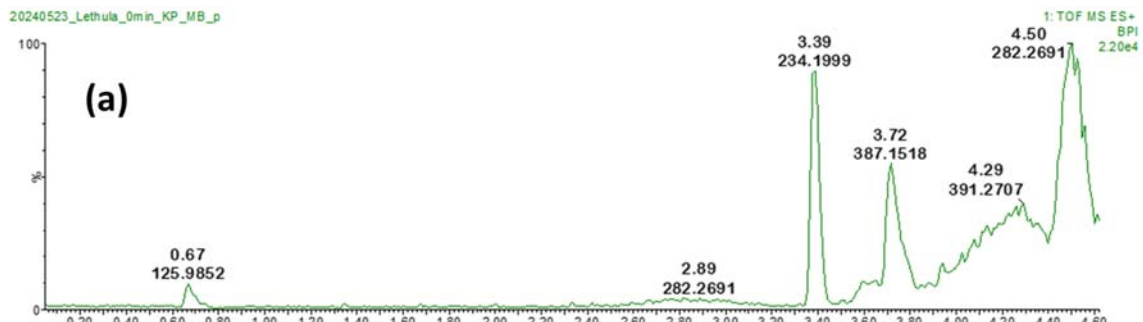


Fig. S3 (a) Re-usability study, (b) FTIR spectra, (c) XRD spectrum, of NiFe LDH/AC, before and after adsorption-photodegradation process



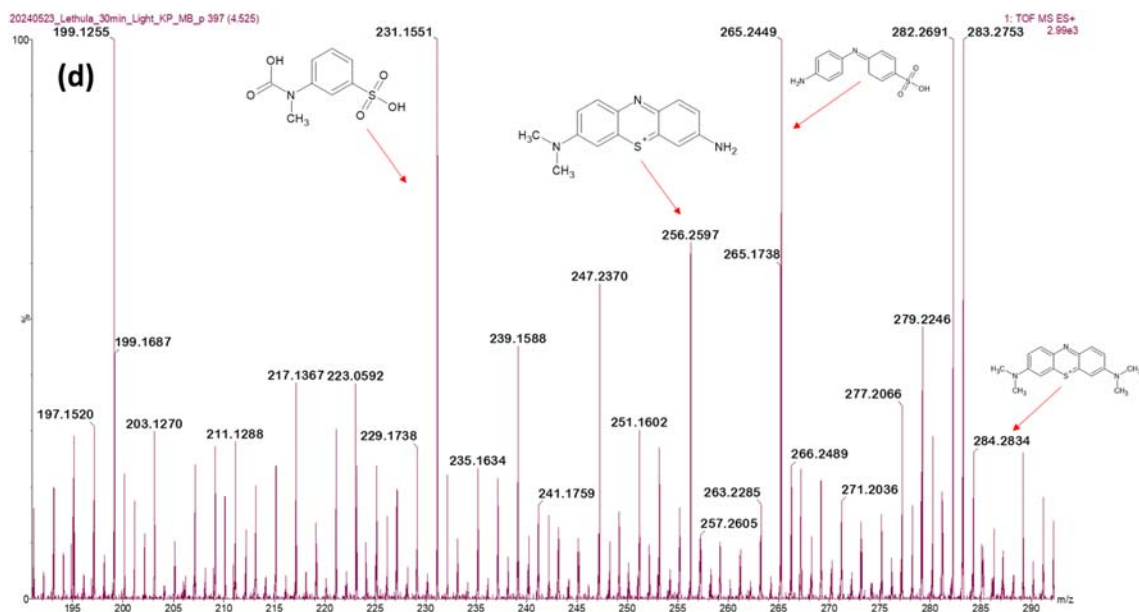


Fig S4 UPLC chromatograms for MB under (a) 0 min and (b) 30 min of light irradiation, and (c-d) depict mass spectra of 30 min MB degradation under light irradiation

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