Supporting Information

Graphene Oxide-Chitosan Composite Material for Treatment of Dye Effluent

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1. Characterization

1.1 Regeneration Study

Regeneration of adsorbents is a vital consideration in advanced industrial wastewater applications, due to both economic demands and severe ecological for sustainability purposes [1]. Therefore, an advantage of GO cross-linked materials developed in this study is a facile separation process and efficient regeneration over multiple adsorption cycles.

The desorption of MB from GO and GO-LCTS sorbents was conducted using a mixture of dilute HCl and ethanol (1:1, v/v), until the pH of the washing solution reaches neutral pH. This solvent system represents an inexpensive option for the release of MB and regeneration of sorbent materials [2]. The desorption cycle was followed by drying of the material at 40℃ for 24 h and repeated adsorption through three separate MB adsorption experiments.

As shown in Figure S1, the sorbent materials maintain high removal efficiency toward MB with a minor decline across the first to the third cycle. After the third cycle, the MB removal percentage is preserved up to 88.60 % and 86.85 % for GO-LCTS and GO respectively.
This regeneration study reveals that the novel GO-based materials can effectively regenerated and re-used at least for three adsorption-desorption cycles.

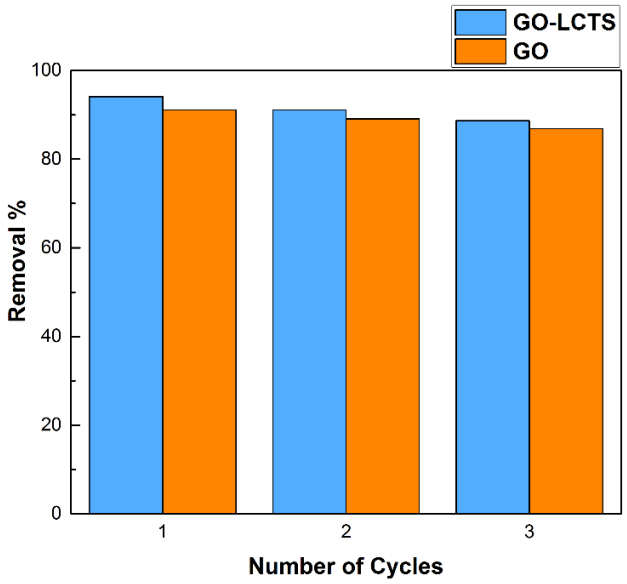

Figure S1. Adsorption−desorption cycles of GO-LCTS (blue bar), and GO (orange bar) for MB systems.

Table S1. Literature comparison of adsorption capacities of various carbon-based adsorbents toward MB in aqueous solution.

Adsorbent	**MB Adsorption capacity (mg/g)**	**Reference**
Carbon nanotube ponytails (CNPs)	150	3
CNTs	46.2	4
Multiwalled Carbon	399	5
Graphene	153.9	6
Graphene–Fe_3O_4 composite	190.1	7
Graphene-Fe_3O_4/SiO_2	97	8
Graphene based hydrogel	139.2	9
Graphene oxide	389.8	10
GO	243.90	11
GO-cyclodextrin-chitosan- Fe_3O_4	84	12
GO-CS-Fe_3O_4	95	13
GO-Fe_3O_4	167	14
GO/Co_3O_4 nanocomposite	40	15
rGO-Co_3O_4	208.8	16
Magnetic reduced graphene oxide loaded hydrogels	119	17
rGO-PEGDMA	60	17
Magnetic GO-carboxymethyl chitosan	95.16	18
3D rGO-hydrogel	7.85	19
GO Chitosan cross-linked composite	402	This Study

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