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SUPPLEMENTARY MATERIAL TO

Investigation of the adsorption behaviors of thymol blue, crystal violet, and rhodamine b on lichen-derived activated carbon

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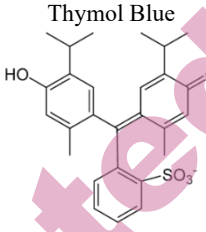
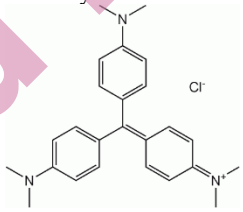
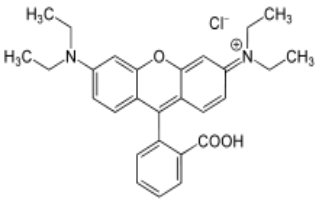
Table S-I. Some specifications of TB, CV, and RB

	Thymol Blue	Crystal Violet	Rhodamine B
Molecular structure			
Chemical formula	C27H30O5S	C25H30ClN3	C28H31ClN2O3
Molecular weight	466.59 g/mol	407.99 g/mol	479.02 g/mol
GHS pictograms			

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(a) (b)

Fig. S-1. a) Lichen *Pseudevernia furfuracea* from Ericek-Bursa; b) lichen-derived activated carbon.

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Table S-II. The linearized versions of the PFO, PSO, IDM, Langmuir, Freundlich, and D-R models

Model Name	Model Equation	Plots axis (y ; x)	Model Parameter
PFO	$ln\,(q_e - q_t) = \ln\,(q_e) - k_1 * t$	$\ln(q_e - q_t)\,;\ t$	q_e, q_t : (mg g^{-1}) k_1: (min^{-1})
PSO	$\frac{t}{q_t} = \frac{1}{k_2 * {q_e}^2} + \frac{t}{q_e}$ $k_0 = k_2 * {q_e}^2$	$\frac{t}{q_t}\ ;\ t$	k_2, k_0: (g mg^{-1} min^{-1})
IDM	$q_t = k_d * t^{1/2} + \theta$	$q_t\ ;\ t^{1/2}$	k_d: (mg g^{-1} $min^{-1/2}$) θ: (mg g^{-1})
Langmuir	$\frac{1}{q_e} = \frac{1}{K * C_e * q_m} + \frac{1}{q_m}$	$\frac{1}{q_e}\ ;\ \frac{1}{C_e}$	K : (L mg^{-1}) C_e: (mg L^{-1}) q_m: (mg g^{-1})
Freundlich	$\ln\,(q_e) = \ln\,\left(k_f\right) + \frac{1}{n} * \ln\,(C_e)$	$\ln(q_e)\ ;\ \ln(C_e)$	k_f: (mg g^{-1})
D-R	$\ln\,(q_e) = \ln\,(q_m) - K' * \varepsilon^2$ $\varepsilon = R * T * \ln\,(1 + 1/C_e)$ $E = 1/\sqrt{2 * K'}$	$\ln\,(q_e)\ ;\ \varepsilon^2$	q_m, q_e: (mol g^{-1}) Ɛ: Polanyi potential K': (mol^2 kJ^{-2}) E: (kJ mol^{-1})

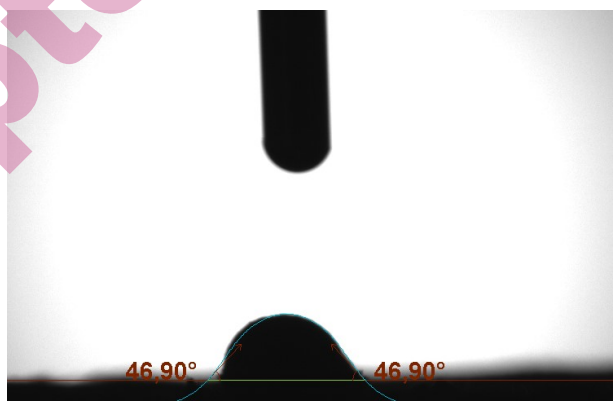

Fig. S-2. Contact angle of the LDAC.

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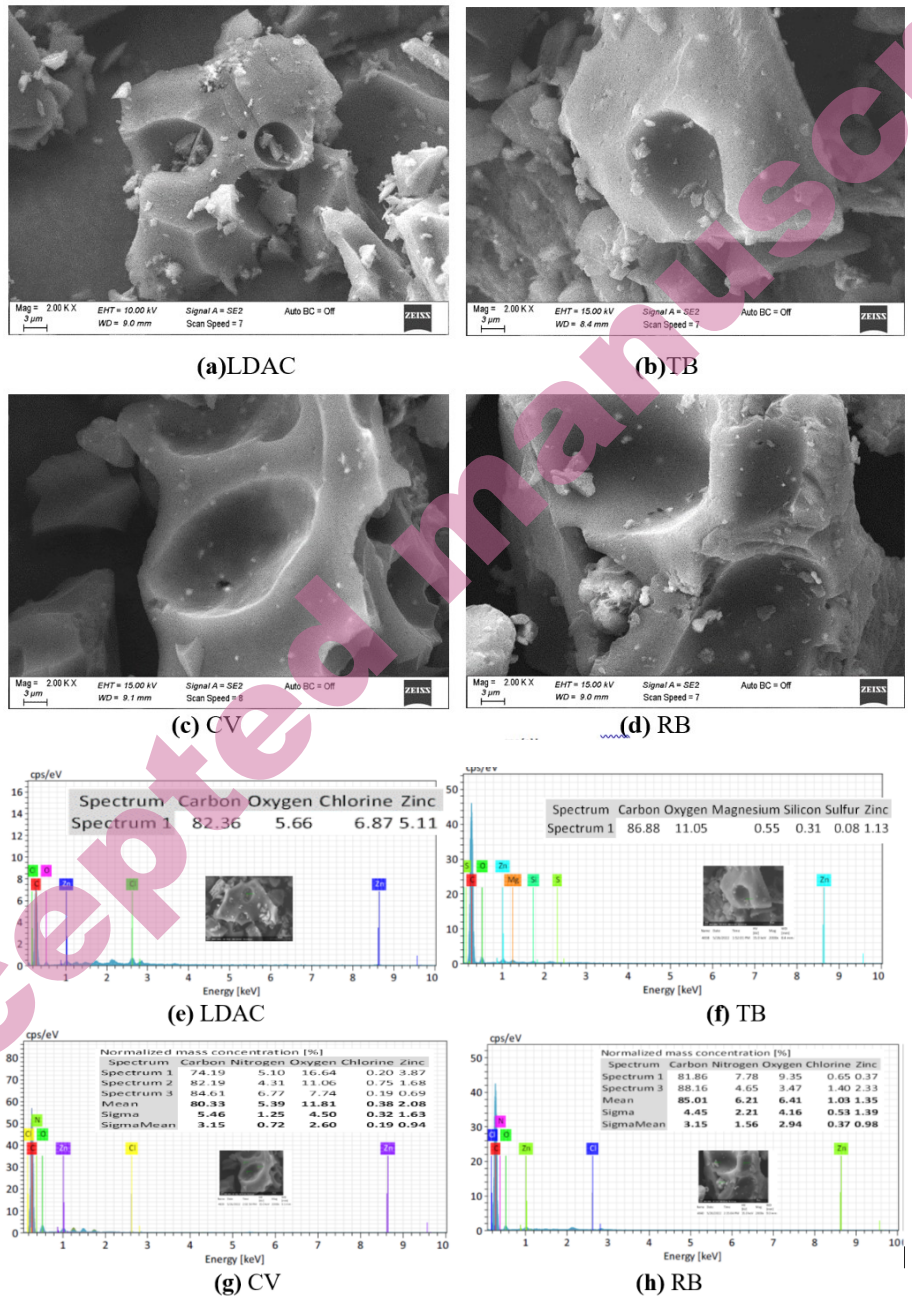

(a)LDAC **(b)**TB

(c) CV **(d)** RB

(e) LDAC **(f)** TB

(g) CV **(h)** RB

Fig. S-3. SEM photos and EDX results of the LDAC before (a, e) and after TB (b, f), CV (c, g), RB (d, h) loaded.

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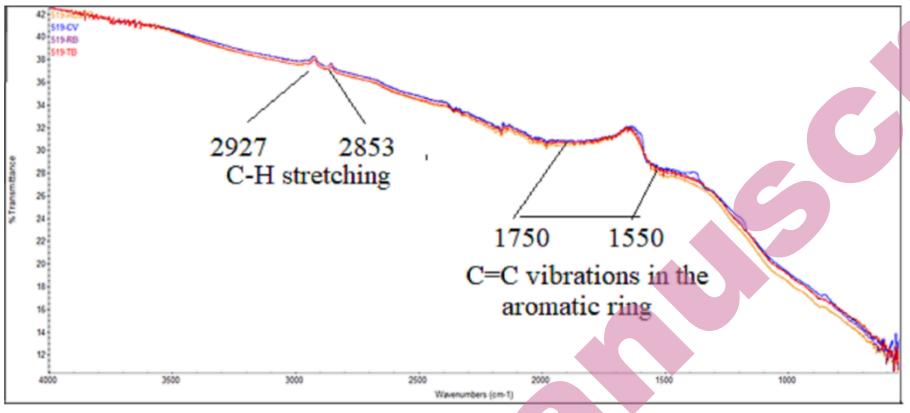

Fig. S-4. FT-IR interferograms of the LDAC before and after TB, CV, and RB loaded.

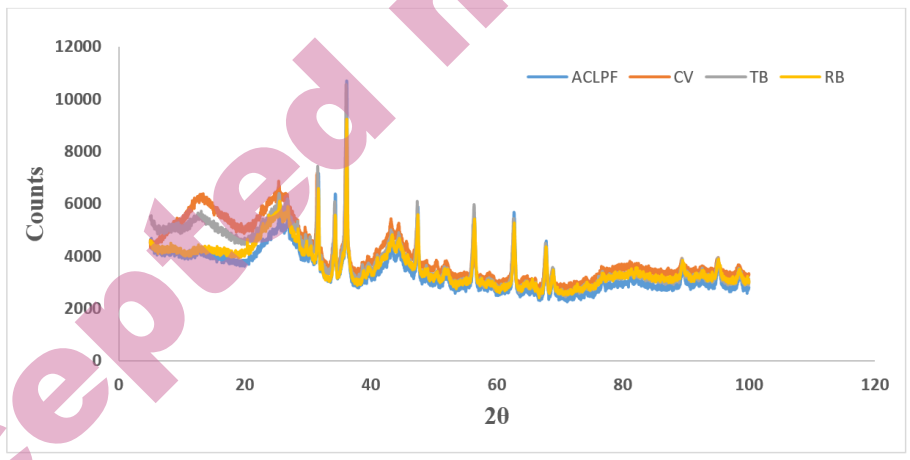

Fig. S-5. XRD patterns of the LDAC before and after TB, CV, and RB adsorptions.

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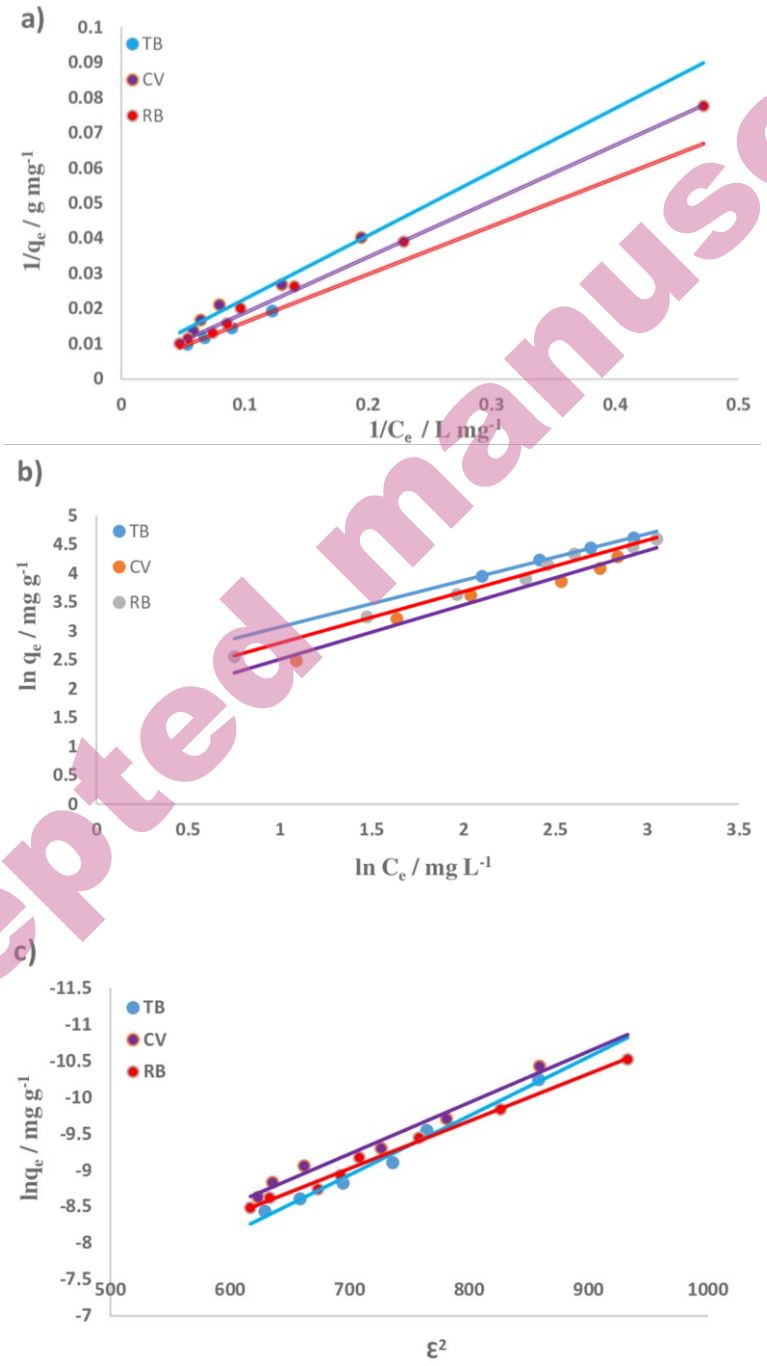

Fig. S-6. a) Langmuir; b) Freundlich; c) D-R isotherms for TB, CV, and RB.

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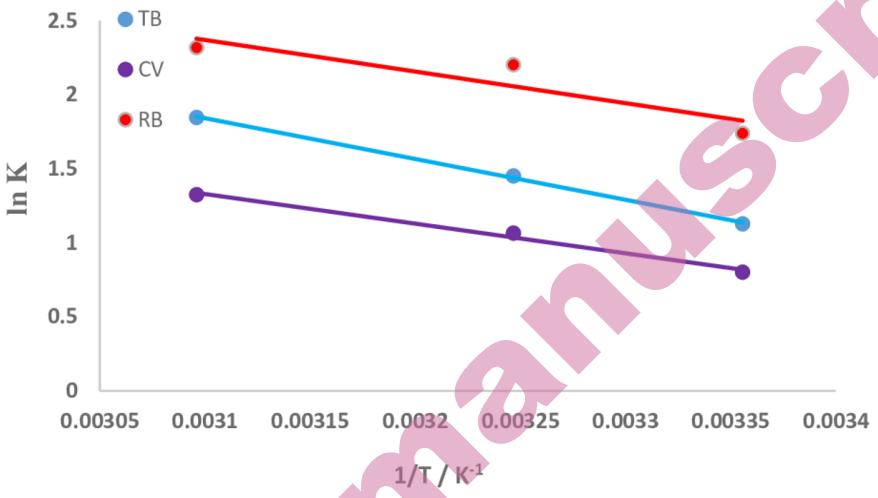

Fig. S-7. The thermodynamic plots for TB, CV, and RB adsorption.

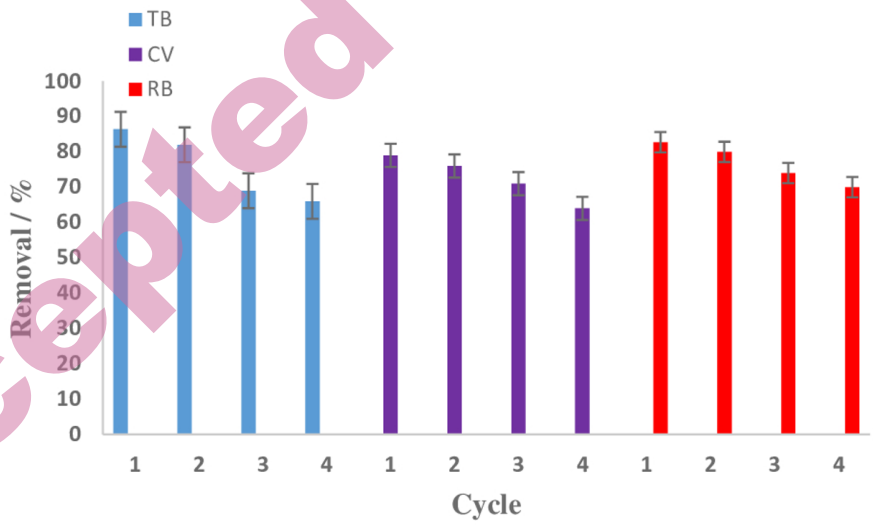

Fig. S-8. The Reusability of the LDAC for TB, CV, and RB adsorption.

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