

## Supporting Information

### **Methyl Orange Adsorption on Biochar Obtained from Prosopis juliflora Waste: Thermodynamic and Kinetic Study**

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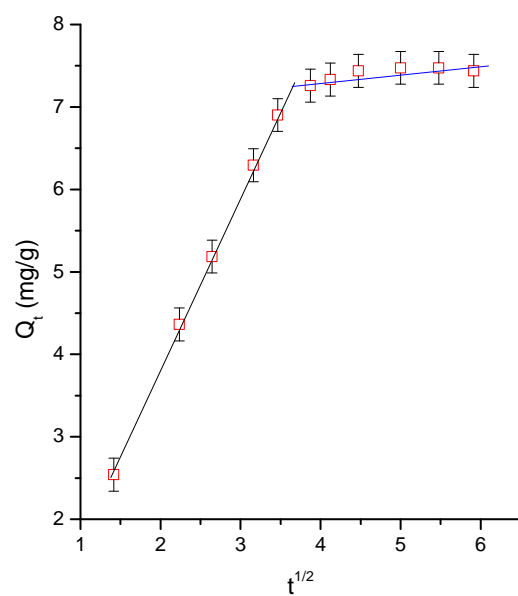
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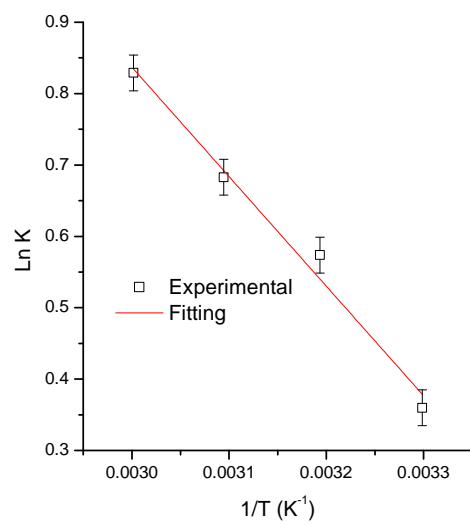
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Table S1. List symbols &amp; abbreviations.

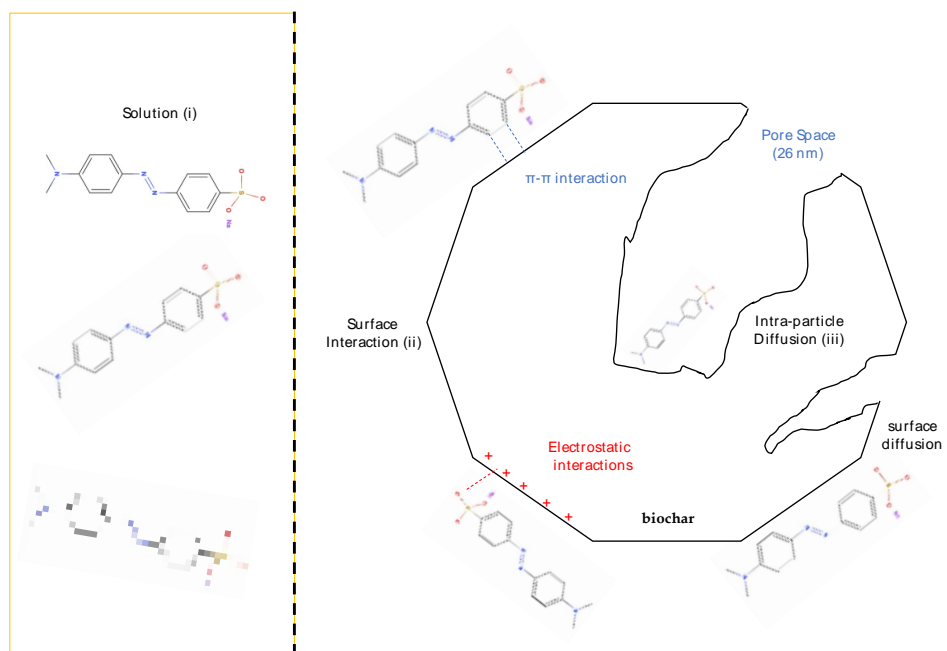
Name/symbol (units)	Abbreviation
<i>Prosopis Juliflora</i> waste	PJW
methylene orange	MO
Enthalpy	$\Delta H$
Entropy	$\Delta S$
Free energy Gibbs	$\Delta G$
MO amount of anchored per unit mass of the adsorbent ( $\text{mg g}^{-1}$ )	$q_t$
maximum sorption capacity ( $\text{mg g}^{-1}$ )	$q_e$
Rate constant pseudo-first order model ( $\text{min}^{-1}$ )	$k_1$
Rate constant pseudo-second order model ( $\text{g mg}^{-1}\text{min}^{-1}$ )	$k_2$
Intraparticle diffusion rate constant ( $\text{mg/ g}^{-1}\text{min}^{1/2}$ )	$k_{id}$
Langmuir maximum uptake of MO per gram of biomass ( $\text{mg/g}$ )	$q_m$
Langmuir constant ( $\text{L/mg}$ )	$K_L$
The equilibrium concentration of MO ( $\text{mg/L}$ )	$C_e$
Freundlich constant ( $(\text{mg/g}) (\text{L/mg})^{1/n}$ )	$K_F$
Temkin constant related to the heat of sorption ( $\text{J/mol}$ )	$b_T$
The equilibrium binding constant ( $\text{L/mg}$ ),	$A_T$
Average relative error (%)	$ARE$
The fitting correlation coefficient	$R^2$



**Figure S1.** Intra-particle diffusion fitting for experimental data of MO adsorption on PJW biochar



**Figure S2.** Linear fitting of Arrhenius equation for MO adsorption on PJW biochar.



**Figure S3.** Possible diagram for MO sorption onto PJW biochar: (i) the process begins with the external mass transfer from the solution to the surface biochar. (ii) different chemical groups assist the MO anchoring to the PJW surface. (iii) intraparticle diffusion into the PJW pores. (steps ii and iii could occur at the same time).