materials

Article

Mesoporous Carbons and Highly Cross-linking Polymers for Removal of Cationic Dyes from Aqueous Solutions—Studies on Adsorption Equilibrium and Kinetics

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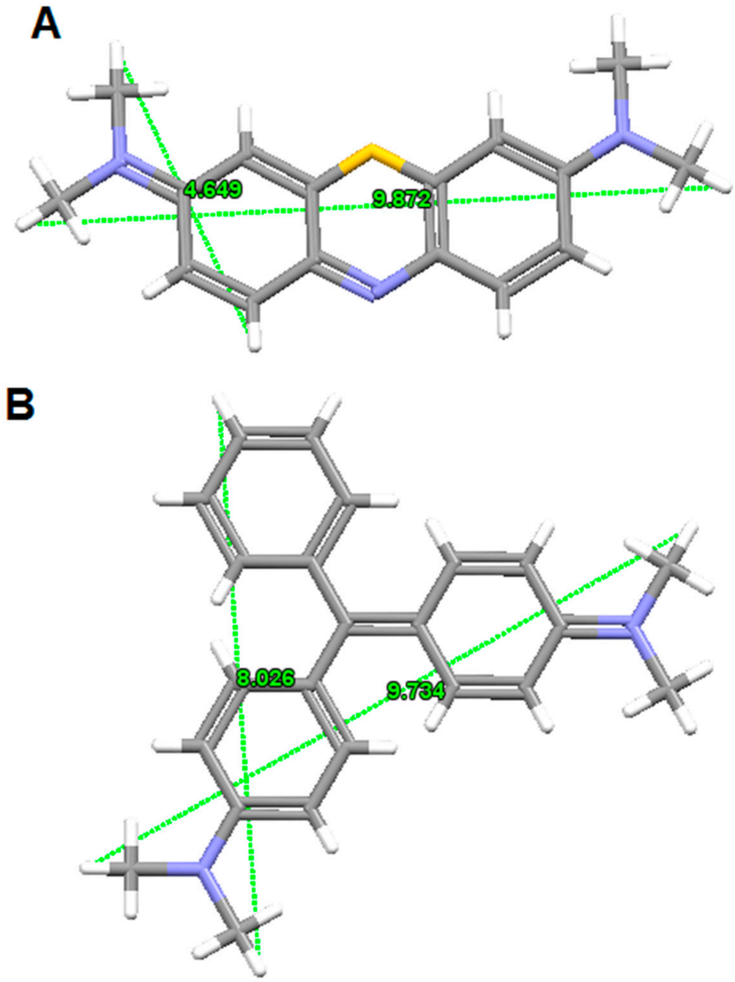

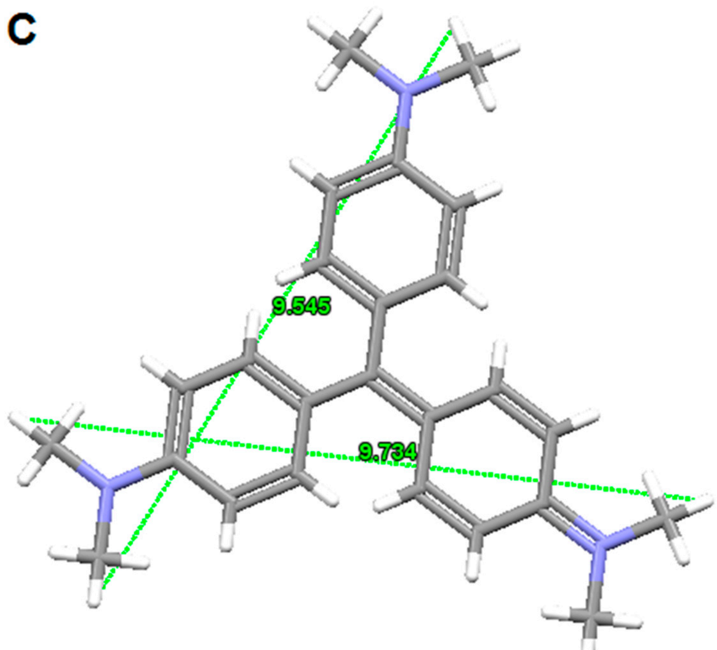

Figure S1. Distance between the most remote atoms in a molecule of (**A**) methylene blue, (**B**) malachite green, and (**C**) crystal violet measured by means of Mercury 3.7 (Build RC1) tools.

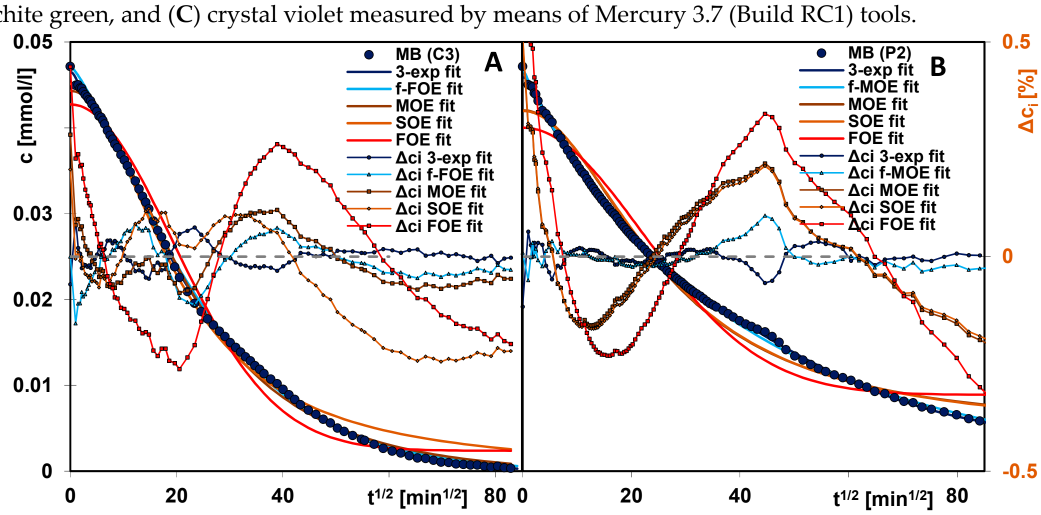

Figure S2. Comparison of fitting quality by using the FOE, SOE, MOE, m-exponential, and f-MOE equations for a description of kinetic data for the MB (C3) system (**A**) and the MB (P2) system (**B**).

Table S1. Comparison of the parameters of various kinetic equations.

Adsorption system	fit	f_2/p	log k [1]	$t_{0.5}$ [min] [2]	u_{eq}	SD(c/c_0) [%]	$1-R^2$
MB (C3)	FOE	0	-2.87	513	0.94	3.63	$1.09\cdot10^{-2}$
	SOE	1	-2.61	412	1	2.75	$6.68\cdot10^{-3}$
	MOE	0.84	-3.49	469	1	1.42	$1.6\cdot10^{-3}$
	m-exp	--	-2.78	416	1	0.57	$2.53\cdot10^{-4}$
	f-FOE	0/0.65	-2.87	420	1	1.12	$1.03\cdot10^{-3}$
MB (C4)	FOE	0	-2.24	121	1	1.91	$4.04\cdot10^{-3}$
	SOE	1	-1.92	84	1	5.93	$4.75\cdot10^{-2}$
	MOE	0.13	-2.28	119	1	1.88	$3.92\cdot10^{-4}$

	m-exp	--	-2.16	99	1	0.74	$5.86 \cdot 10^{-3}$
	f-MOE	-1/0.77	-2.00	114	1	1.57	$2.62 \cdot 10^{-3}$
MB (P1)	FOE	0	-2.28	133	0.91	3.13	$1.93 \cdot 10^{-2}$
	SOE	1	-2.05	112	0.97	2.69	$1.41 \cdot 10^{-2}$
	MOE	0.77	-2.73	113	0.93	2.54	$1.25 \cdot 10^{-2}$
	m-exp	--	-2.10	87	0.98	0.69	$8.60 \cdot 10^{-4}$
	f-MOE	-1/0.53	-1.88	91	0.93	2.01	$7.66 \cdot 10^{-3}$
MB (P2)	FOE	0	-2.99	674	0.81	4.77	$4.12 \cdot 10^{-2}$
	SOE	1	-2.84	699	0.91	3.03	$1.62 \cdot 10^{-2}$
	MOE	0.99	-5.20	675	0.90	3.05	$1.63 \cdot 10^{-2}$
	m-exp	--	-2.91	570	0.92	0.49	$3.88 \cdot 10^{-4}$
	f-FOE	0/0.47	-3.19	707	1	0.55	$5.10 \cdot 10^{-4}$
MG (C3)	FOE	0	-3.08	826	0.93	3.91	$1.71 \cdot 10^{-2}$
	SOE	1	-2.88	764	1	2.61	$7.89 \cdot 10^{-3}$
	MOE	0.99	-5.21	729	1	2.70	$8.03 \cdot 10^{-3}$
	m-exp	--	-3.01	710	0.99	0.30	$9.70 \cdot 10^{-5}$
	f-MOE	-1/0.52	-2.78	726	1	0.62	$4.23 \cdot 10^{-4}$
MG (C4)	FOE	0	-2.40	173	0.97	3.01	$1.19 \cdot 10^{-2}$
	SOE	1	-2.11	129	1	3.21	$1.50 \cdot 10^{-2}$
	MOE	0.75	-2.84	154	1	1.85	$4.49 \cdot 10^{-3}$
	m-exp	--	-2.22	116	0.99	0.35	$1.57 \cdot 10^{-4}$
	f-MOE	-1/0.56	-2.04	130	1	0.88	$9.84 \cdot 10^{-4}$
CV (C3)	FOE	0	-3.30	1379	0.92	3.33	$1.10 \cdot 10^{-2}$
	SOE	1	-3.12	1309	1	3.06	$9.63 \cdot 10^{-3}$
	MOE	0.99	-6.02	1279	0.99	3.19	$1.04 \cdot 10^{-2}$
	m-exp	--	-3.28	1311	0.98	0.32	$9.50 \cdot 10^{-5}$
	f-MOE	-1/0.58	-3.06	1365	1	0.98	$1.41 \cdot 10^{-4}$
CV (C4)	FOE	0	-2.81	446	0.89	3.67	$1.81 \cdot 10^{-2}$
	SOE	1	-2.67	466	1	1.97	$5.31 \cdot 10^{-3}$
	MOE	0.99	-5.55	454	1	2.05	$5.73 \cdot 10^{-3}$
	m-exp	--	-2.77	406	1	0.38	$1.84 \cdot 10^{-4}$
	f-MOE	-0.56/0.54	-2.67	415	1	0.46	$2.80 \cdot 10^{-4}$
CV (P1)	FOE	0	-2.31	140	0.98	2.70	$8.53 \cdot 10^{-3}$
	SOE	1	-1.98	95	1	4.13	$2.30 \cdot 10^{-2}$
	MOE	0.62	-2.59	126	1	2.00	$4.70 \cdot 10^{-3}$
	m-exp	--	-2.12	92	0.99	0.25	$6.82 \cdot 10^{-5}$
	f-MOE	-1/0.61	-1.98	111	1	1.27	$1.87 \cdot 10^{-3}$
CV (P2)	FOE	0	-2.74	383	0.95	3.25	$9.70 \cdot 10^{-3}$
	SOE	1	-2.51	322	1	2.27	$5.03 \cdot 10^{-3}$
	MOE	0.86	-3.43	356	1	1.00	$9.16 \cdot 10^{-4}$

	m-exp	--	-2.69	337	0.99	0.38	$1.27 \cdot 10^{-4}$
	f-MOE	0.45/0.773	-2.99	333	0.99	0.42	$1.99 \cdot 10^{-4}$

[1] k: k_1-FOE, f-FOE and MOE, f-MOE; k_2-SOE and f-SOE; k_{avg}-m-exp; [2] $t_{0.5}$ for m-exp is the overall half-time calculated numerically from $t_{0.5,i}$ for each of the terms.