Electronic Supplementary Information

Magnetically Separable Carbon Capsules Loaded with Laccase and their Application to Dye Degradation

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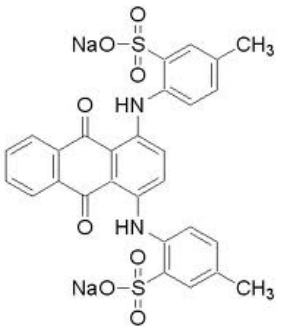
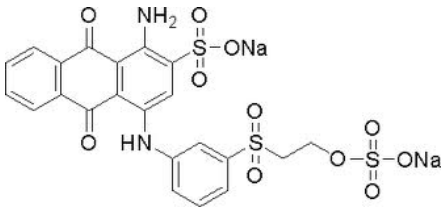


Acid Green 25 (AG 25)

Anthraquinone anionic dye
Mw: 622.6 g·mol^{-1}
λ_{max}: 608 nm
Purity: 75 %



Remazol Brilliant Blue R (RBBR)
Reactive Blue 19

Anthraquinone anionic dye
Mw: 626.5 g·mol^{-1}
λ_{max}: 592 nm
Purity: 50 %

Figure S-1. Chemical structure and properties of the selected dyes.

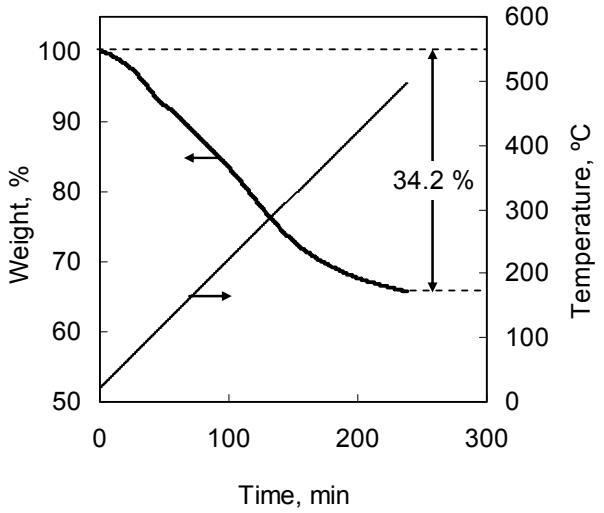


Figure S-2. Thermogravimetric measurements corresponding to a sample of OR loaded over MHC composite. Experimental conditions: 2 ºC/min up to 500 ºC in a nitrogen atmosphere. Amount of adsorbed OR as deduced from the loss in weight: 520 mg OR·g^{-1} of support. Value estimated by UV-vis measurements: 540 mg OR·g^{-1} support.

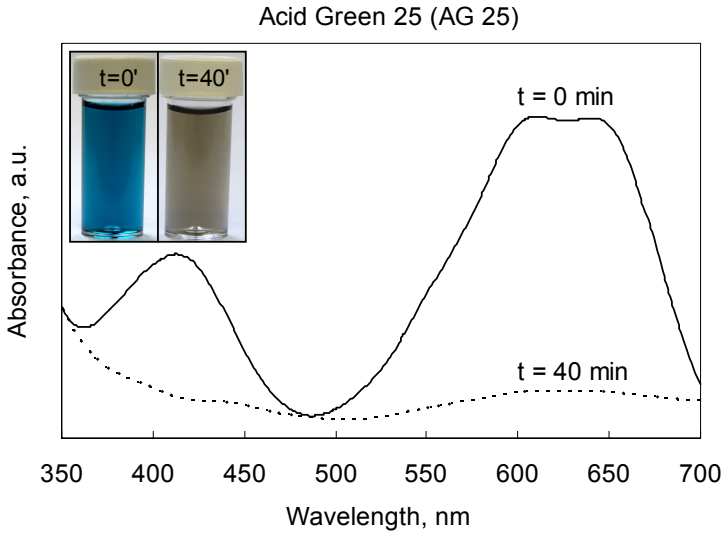


Figure S-3. UV-vis spectrum of Acid Green 25 (AG 25) solution (initial concentration of 0.65 mg·mL^{-1}) before (solid line) and after (dotted line) degradation by the laccase immobilized on magnetic carbon capsules. Inset: image of AG 25 solution before (t=0) and after the degradation process (t= 40 min).

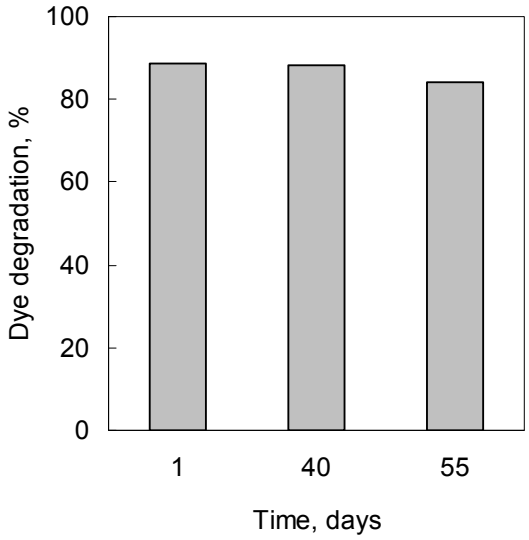


Figure S-4. Activity of immobilized laccase after long storage times. The dye employed in these experiments was AG 25.

Table S-1. Textural properties of several magnetic supports and their corresponding amounts of immobilized laccase.

Immobilization support	S_{BET} ($m^2 \cdot g^{-1}$)	Pore volume ($cm^3 \cdot g^{-1}$)	Pore size (nm)	Adsorption capacity ($mg \cdot g^{-1}$)	Reference
Magnetic mesoporous carbon capsules	780	0.94	3.4	100	This work
Magnetic mesoporous silica spheres	421	0.63	24.7	82	Zhu et al. (2007)
Magnetic mesoporous silica nanoparticles	580	2.14	14.5	73	Wang et al. (2010)

- Zhu, Y.; Kaskel, S.; Shi, J.; Wage, T.; van Pée, K. H., Immobilization of Trametes versicolor Laccase on Magnetically Separable Mesoporous Silica Spheres. *Chem. Mater.* **2007**, 19 (26), 6408-6413.

- Wang, F.; Guo, C.; Yang, L.-R.; Liu, C.-Z., Magnetic mesoporous silica nanoparticles: Fabrication and their laccase immobilization performance. *Bioresour. Technol.* **2010**, 101 (23), 8931-8935.

Table S-2. Characteristic infrared bands of proteins (J. Kong and S. Yu, *Acta Biochimica et Biophysica Sinica*, 2007**, 39**, 549).

Designation	Approximate frequency (cm^{-1})	Description
Amide A	3300	NH stretching
Amide B	3100	NH stretching
Amide I	1600−1690	C=O stretching
Amide II	1480−1575	CN stretching, NH bending
Amide III	1229−1301	CN stretching, NH bending
Amide IV	625−767	OCN bending
Amide V	640−800	Out-of-plane NH bending
Amide VI	537−606	Out-of-plane C=O bending