

Supplementary Information

Synthesis, Characterization and Enhanced Photocatalytic Activity of Iron Oxide/Carbon Nanotube/Ag-doped TiO₂ Nanocomposites

José O. Marques Neto,^a Carlos R. Bellato,^a Carlos H. F. de Souza,^a Renê C. da Silva^b and Pablo A. Rocha^c*

^aDepartamento de Química, ^bDepartamento de Física and ^cDepartamento de Solos, Universidade Federal de Viçosa (UFV), 36570-900 Viçosa-MG, Brazil

This photoreactor consists of a 125 W mercury vapor lamp without the bulb shield placed within a glass tube (30.0 cm long, 5.0 cm diameter, cut off filter for $\lambda > 300$ nm). The lamp was placed inside a glass cylinder measuring 10 cm in diameter, with capacity of 600 mL, which was placed a solution of phenol 50 mg L⁻¹. The glass cylinder containing the sample was immersed in a tube with a water recirculating system maintaining the temperature at 30 ± 2 °C.

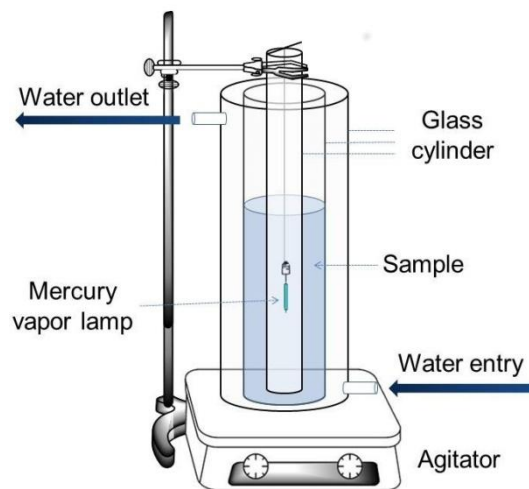


Figure S1. Illustration of the annular photoreactor.

*e-mail: bellato@ufv.br

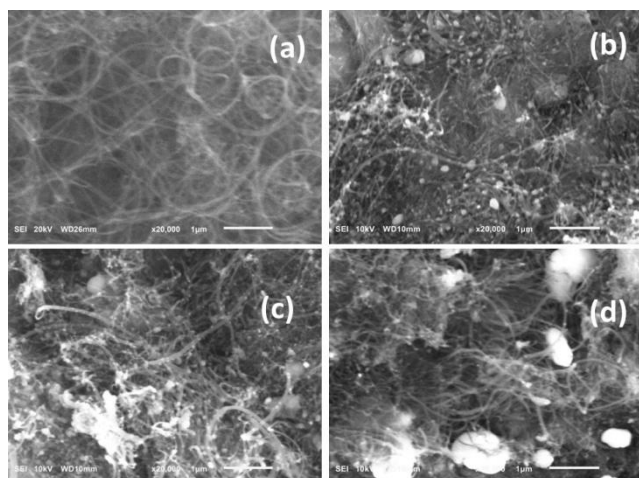


Figure S2. SEM images of the photocatalysts: (a) MWCNT, (b) MWCNT/TiO₂-Ag-9, (c) 10-Fe/MWCNT/TiO₂-Ag-9, (d) 10-Fe/MWCNT/TiO₂-Ag-9 (reused).

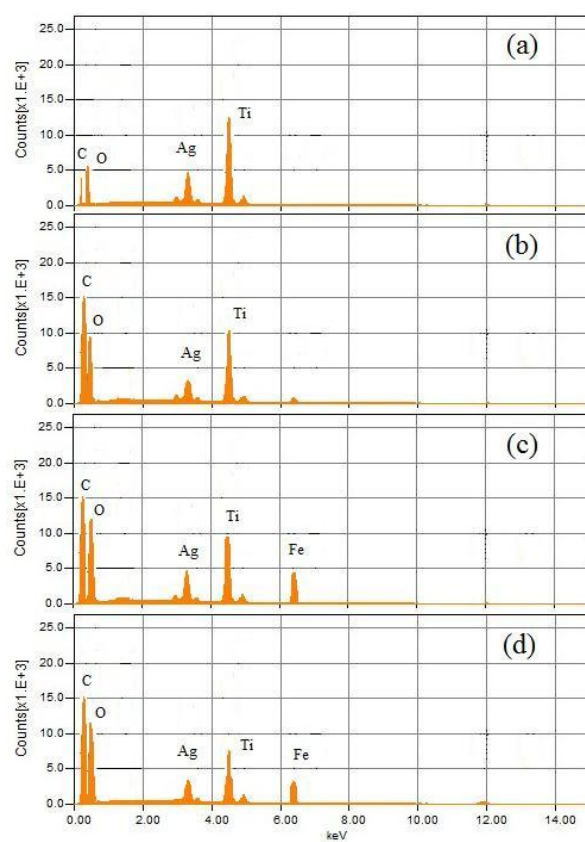


Figure S3. EDS spectra of (a) TiO₂-Ag-9, (b) MWCNT/TiO₂-Ag-9, (c) 10-Fe/MWCNT/TiO₂-Ag-9 and (d) 10-Fe/MWCNT/TiO₂-Ag-9 (reused).

Table S1. Photodegradation of phenol by catalysts with supported TiO₂

Catalyst	Experimental condition					Reference
	Dose / (g L ⁻¹)	Degradation / %	Phenol / (mg L ⁻¹)	Irradiation time / min	Irradiation source/power	
3%-W-TiO ₂	5	61	19.74	60	UV-Vis/1000 W	1
Blue TiO ₂	1	55.7	55	240	UV/230 W	2
TiO ₂ N-doped	0.75	99.6	50	540	UV-Vis/30W	3
Pt-F-TiO ₂ and Pt-S-TiO ₂	1	100	50	120	UV/300W	4
PFT/TiO ₂	1	75	45	120	UV-Vis	5
20-MWCNT-TiO ₂	1	95	50	300	UV-Vis/150W	6
TiO ₂ /SCu5	0.5	73	85	360	UV-Vis/125W	7
TiO ₂ -Fe ₃ O ₄ -MWCNT	1	ca. 100	50	300	UV-Vis/500W	8
10-Fe/MWCNT/TiO ₂ -Ag-9	1	ca. 100	50	180	UV-Vis/125W	this study

Table S2. Langmuir-Hinshelwood apparent rate constant (K_{app}), half-life ($t_{1/2}$) and coefficient of determination (R^2) for the photodegradation of phenol measured by HPLC-DAD

Kinetics			
pH	$K_{app} / \text{min}^{-1}$	$t_{1/2} / \text{min}$	R^2
3.00	0.018	38.5	0.992
4.00	0.020	34.7	0.986
5.20	0.025	27.7	0.995
7.00	0.012	57.8	0.994
9.00	0.007	99.0	0.992
10.00	0.006	115.5	0.987

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