

Supplementary Information

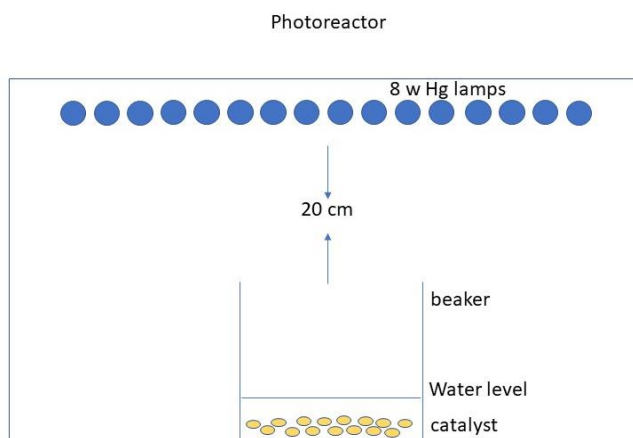
TiO₂ Decorated Sand Grains for Photodegradation of Pollutants: Methylene Blue and Ciprofloxacin Study

Jorge A. S. Lacerda,^a Allan M. Macedo,^b Rodolfo I. Teixeira,^b Grazieli Simões,^b
Emerson S. Ribeiro,^{b,c} Josué S. B. Forero^b and Rodrigo J. Corrêa^{b,*}

^aCentro de Pesquisas e Desenvolvimento Leopoldo Américo Miguez de Mello (CENPES), Petróleo Brasileiro S.A. (PETROBRAS), 21941-915 Rio de Janeiro-RJ, Brazil

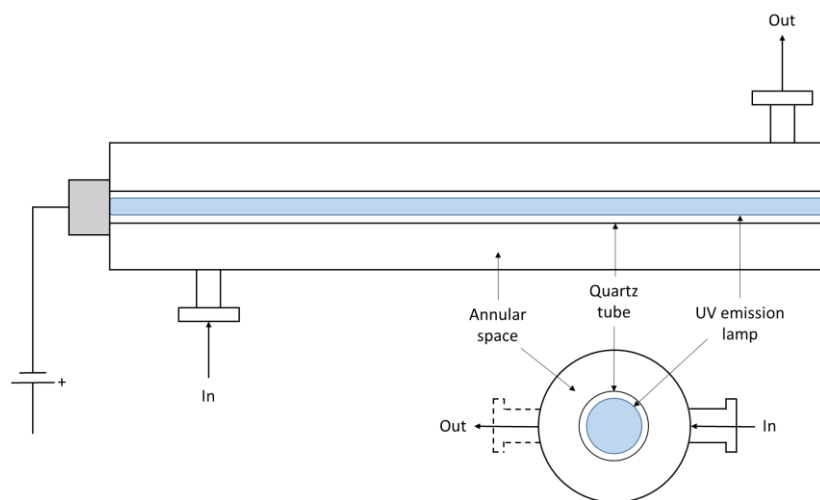
^bInstituto de Química, Universidade Federal do Rio de Janeiro (UFRJ),
21941-909 Rio de Janeiro-RJ, Brazil

^cInstituto Nacional de Tecnologias Alternativas para Detecção,
Avaliação Toxicológica e Remoção de Micropoluentes e Radioativos (INCT-DATREM), Instituto de
Química, Universidade Estadual Paulista (Unesp),
CP 355, 14800-900 Araraquara-SP



Scheme S1. UV reactor for steady state reactions.

*e-mail: rodrigojosecorrea@gmail.com



Scheme S2. UV reactor for flow reactions.

Results

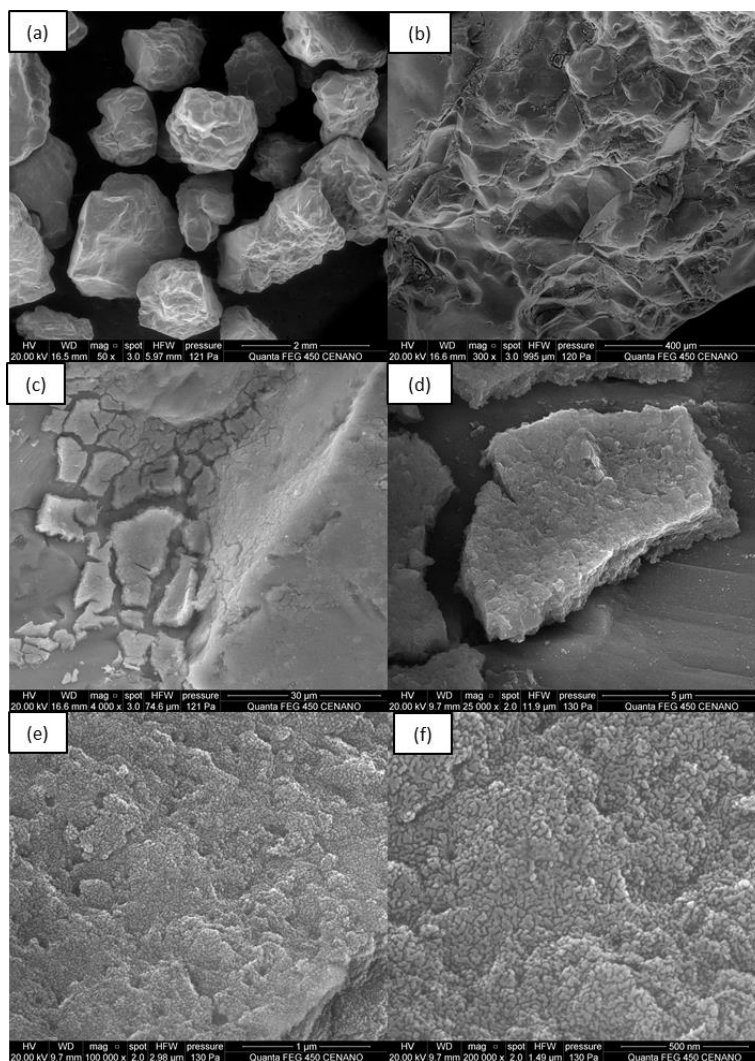
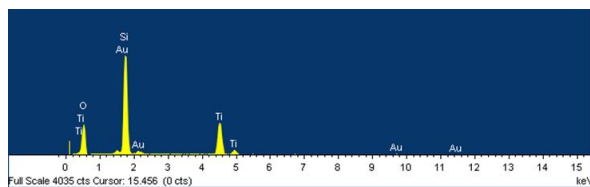
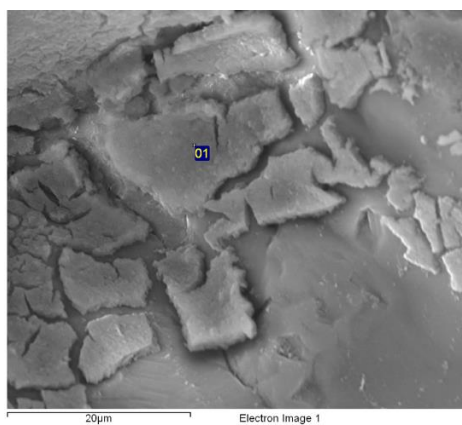
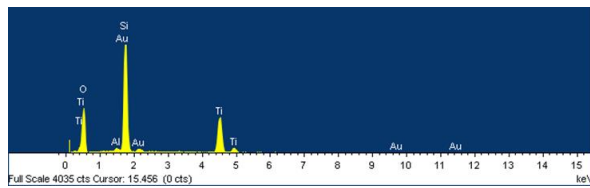
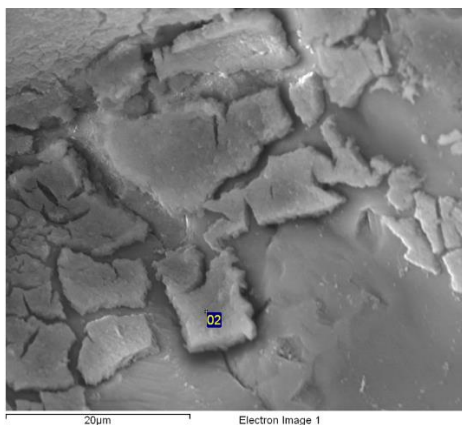


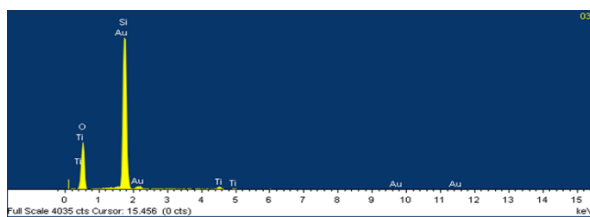
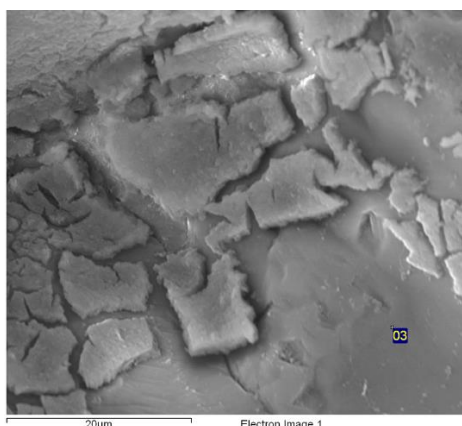
Figure S1. TiO₂ sand supported catalyst FESEM images with successive magnifications. Magnification of (a) 50×; (b) 300×; (c) 4,000×; (d) 25,000×; (e) 100,000× and (f) 200,000×.



Element	App	Intensity	Weight%	Weight%	Atomic%
	Conc.	Corrn.		Sigma	
O K	0.44	0.5499	50.33	0.84	69.35
Si K	0.40	0.9229	26.82	0.51	21.05
Ti K	0.27	0.8368	20.20	0.45	9.30
Au M	0.03	0.6546	2.65	0.48	0.30
Totals			100.00		



Element	App	Intensity	Weight%	Weight%	Atomic%
	Conc.	Corrn.		Sigma	
O K	0.66	0.5970	54.71	0.70	73.00
Al K	0.01	0.8198	0.55	0.09	0.44
Si K	0.44	0.9067	23.86	0.41	18.13
Ti K	0.31	0.8348	18.30	0.37	8.16
Au M	0.03	0.6635	2.57	0.41	0.28
Totals			100.00		



Element	App	Intensity	Weight%	Weight%	Atomic%
	Conc.	Corrn.		Sigma	
O K	0.83	0.9200	52.55	0.61	67.80
Si K	0.73	0.9726	42.43	0.55	31.18
Ti K	0.02	0.8013	1.51	0.14	0.65
Au M	0.04	0.5898	3.51	0.47	0.37
Totals			100.00		

Figure S2. Sand supported TiO₂ catalyst FESEM images and EDS spectra for different catalyst regions. The respective atomic percentages are observed in the inserted tables.

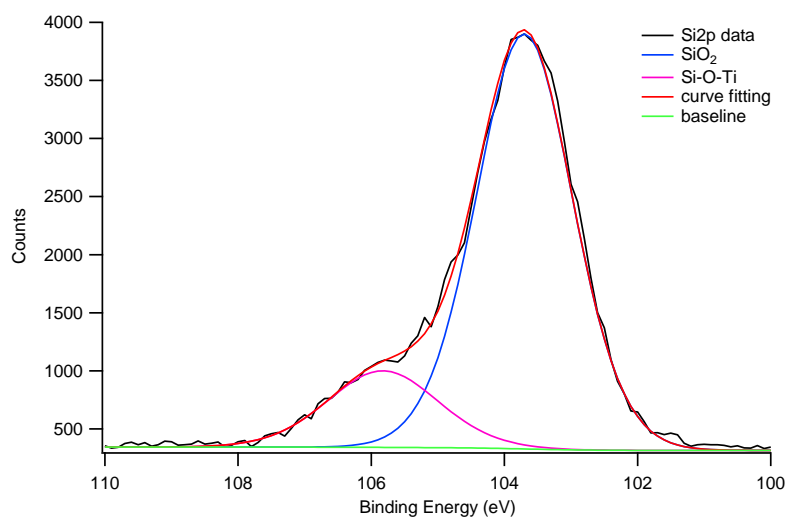


Figure S3. XPS high resolution Si 2p spectra of sand@TiO₂.

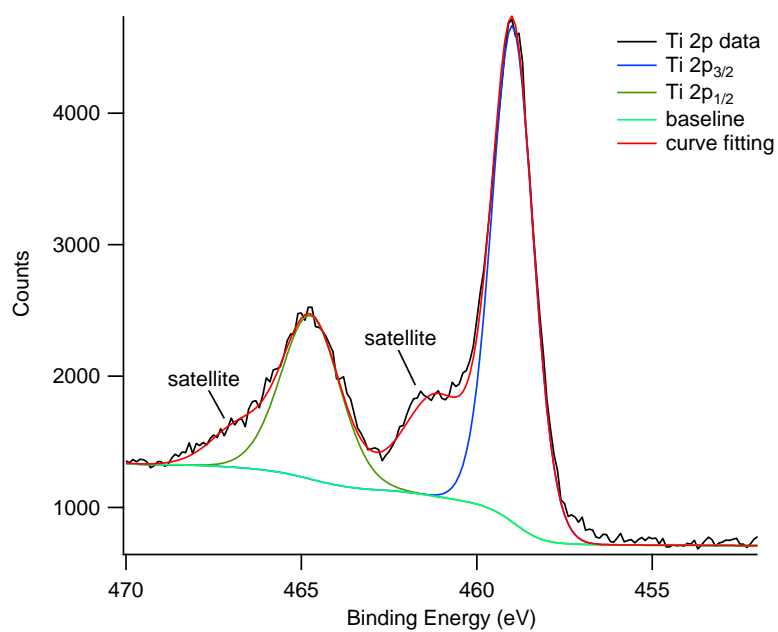


Figure S4. XPS high resolution Ti 2p spectra of sand@TiO₂.

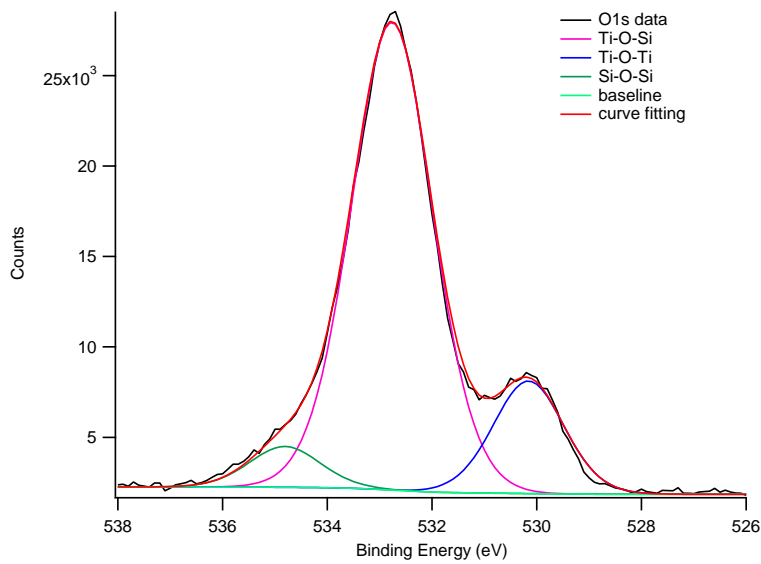


Figure S5. XPS high resolution O 1s spectra of sand@TiO₂.

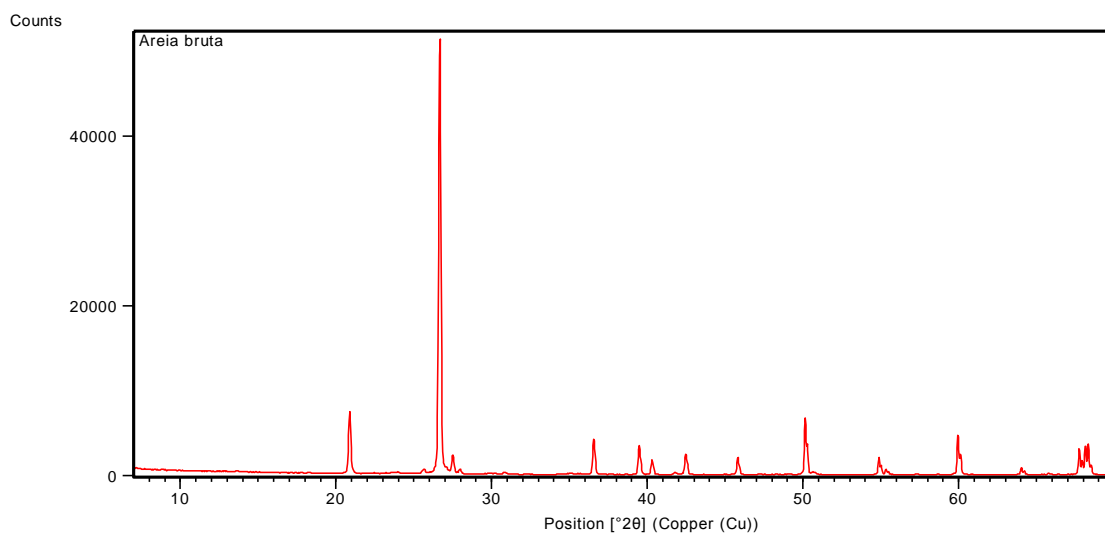


Figure S6. XRD spectra of sand grain.

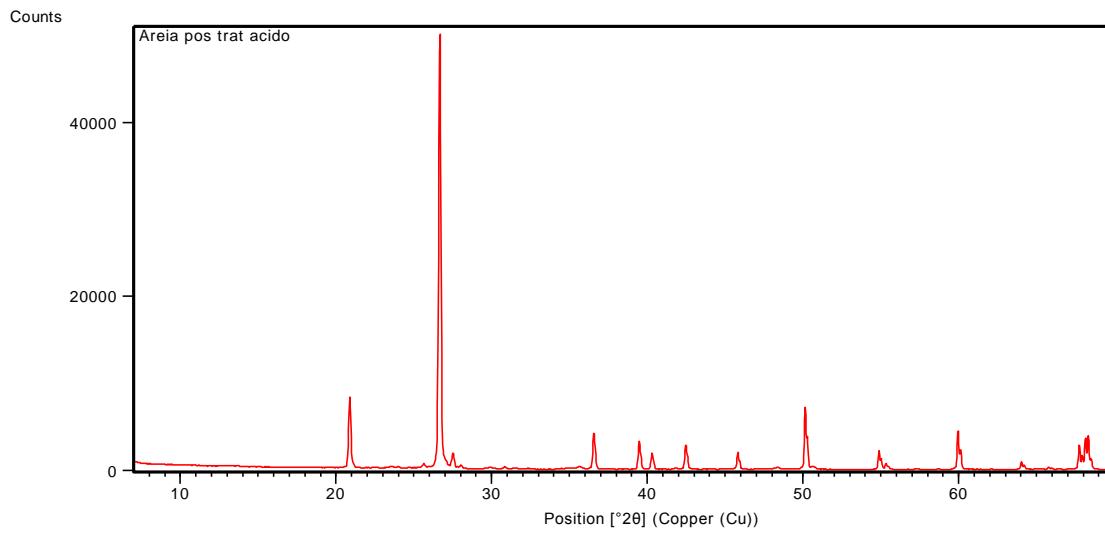


Figure S7. XRD spectra of sand grain after HCl treatment.

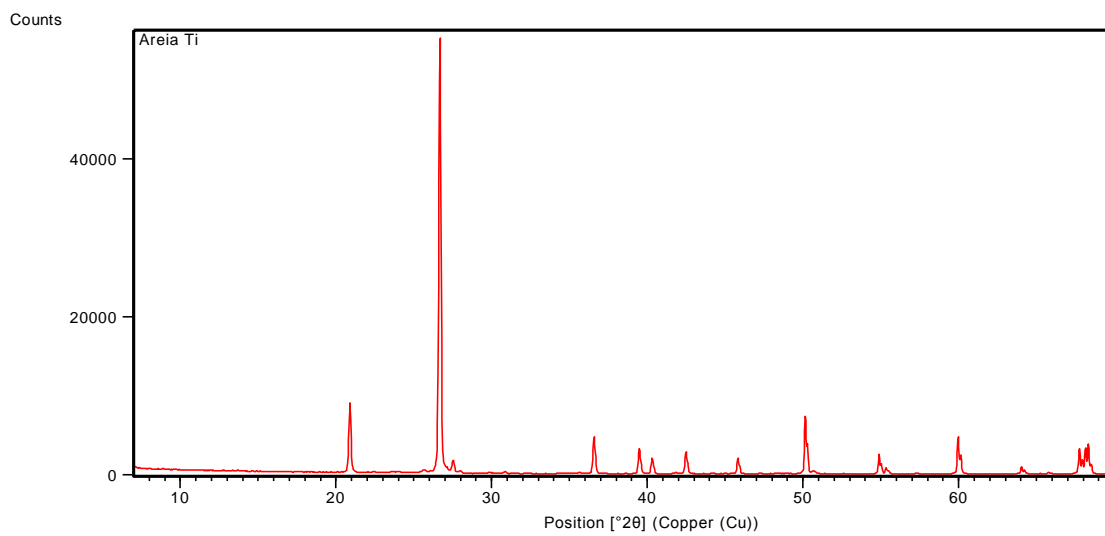


Figure S8. XRD spectra of sand@TiO₂.

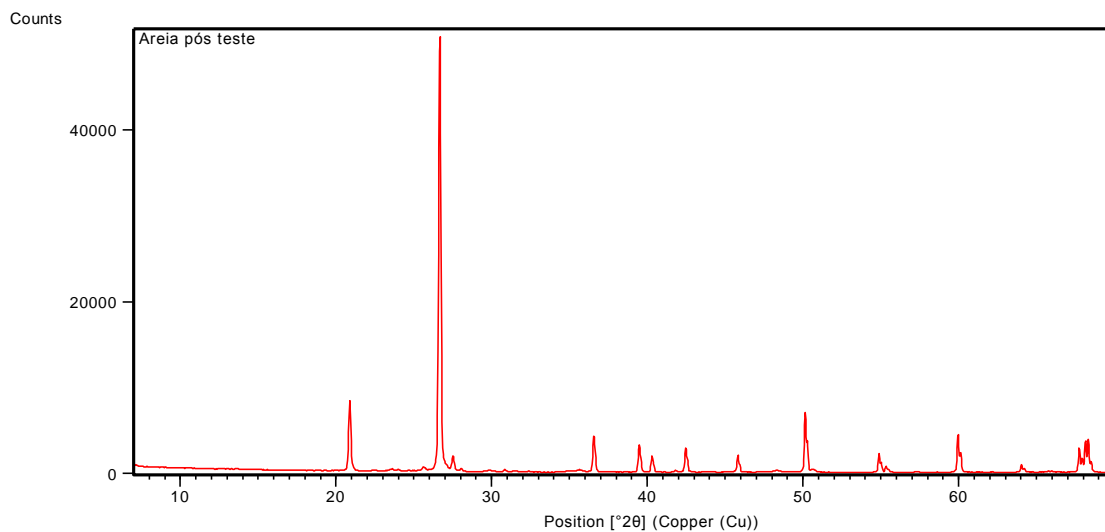


Figure S9. XRD spectra of sand@TiO₂ after catalytic tests.

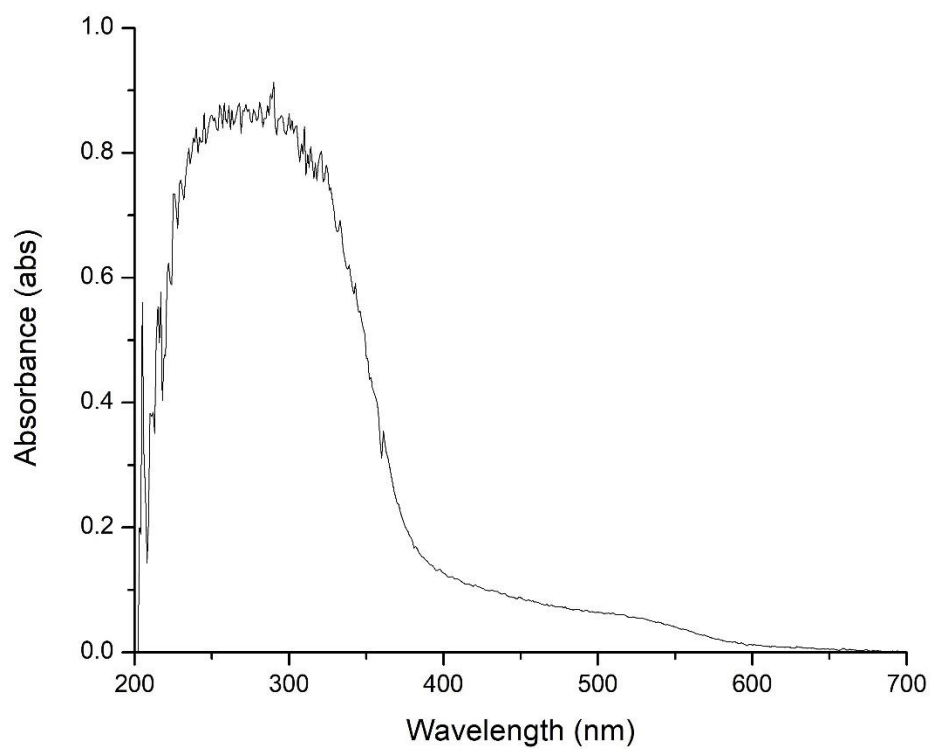


Figure S10. Diffuse reflectance UV-Vis (DRUV) spectra obtained for sand@TiO₂.

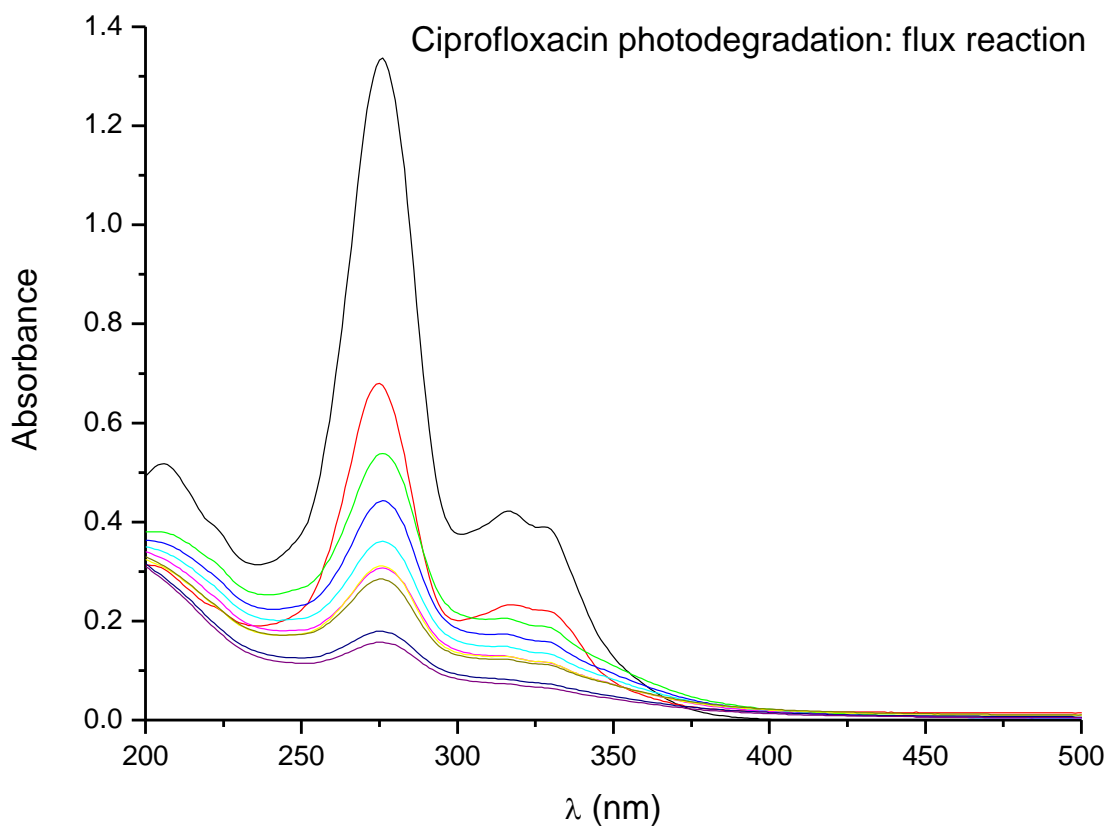


Figure S11. Ciprofloxacin photodegradation over sand@TiO₂ catalyst by using flux reaction.

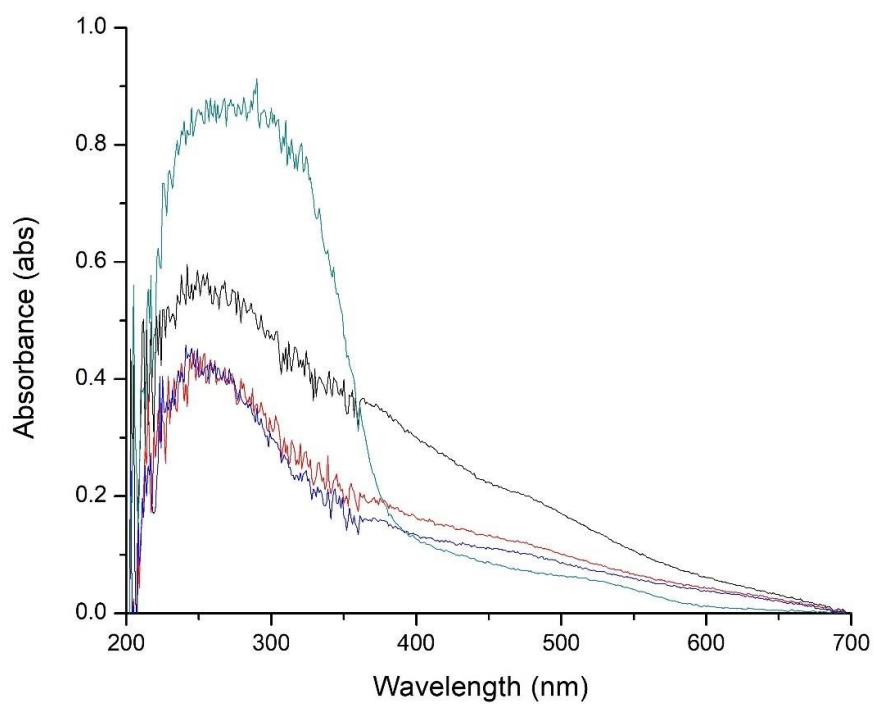


Figure S12. Diffuse reflectance UV-Vis (DRUV) spectra obtained for sand (black); sand treated with acid (red); sand treated with TEOS (blue) and sand@TiO₂ (green).