catalysts

MDPI

Supplementary Material

Fe-Doped TiO_2 Supported on HY Zeolite for Solar Photocatalytic Treatment of Dye Pollutants

Ghania Foura[1], Nawel Chouchou[1], Ahcène Soualah[1], Kahina Kouachi[1], Matteo Guidotti[2,*], Didier Robert[3]

Table S-1. Comparison of the efficiency in the removal of pollutant dyes from aqueous media catalyzed by different photocatalytic systems.

Catalyst	Dye	Dye removal (%)	Irradiation	Time of degradation (min)	Ref.
Fe-TiO_2/HY	Methylene blue	>98	Visible light	60	Present Study
TiO_2/Fe-Pc*	Methylene blue	97	Visible light	90	[S1]
Fe-TiO_2/(HT-DS)**	Methylene blue	96	Visible light	120	[S2]
Fe-Pc/TiO_2	Methyl orange	94	Visible light + H_2O_2	180	[S3]
Fe-TiO_2/Pc	Methyl orange	49	Visible light	180	[S4]
Fe-TiO_2/ZSM-5	Yellow GX	99	Visible light	20	[S5]
Fe-TiO_2/graphene	Crystal violet	74	Visible light	35	[S6]
Ni-TiO_2/ZSM-5	Yellow GX	99	Visible light	60	[S5]
Pt-TiO_2/natural zeolite	Methyl orange	86	Visible light + H_2O_2	30	[S7]
Pt-TiO_2/graphene oxide	Tartrazine	96	Visible light	180	[S8]
Fe-TiO_2/natural clay	Malachite green	>98	UV light + H_2O_2 or $K_2S_2O_8$	30	[S9]
CuO/nano-X-zeolite	Methylene blue	55	UV light	120	[S10]

* Pc: Phthalocyanine; **HT: hydrotalcite, DS: dodecylsulfonate.

References to Supplementary Material

S1. Priyanka K.P., Sankararaman S., Balakrishna K.M., Varghese T. "Enhanced visible light photocatalysis using TiO_2/phthalocyanine nanocomposites for the degradation of selected industrial dyes**"** *J. All. Comp***., 2017,** 720, 541-549.

S2. Miranda L. D. L., Bellato C. R., Milagres J.A. L, Moura L.G., Mounteer A. H., de Almeida M. F. "Hydrotalcite TiO_2 magnetic iron oxide intercalated with the anionic surfactant dodecylsulfate in the photocatalytic degradation of methylene blue dye" *J. Env. Manag*., **2015**, 156, 225-235.

S3. Bin Chen Z. G., Mu J., Zhang M., Zhang P., Zhang Z., Wang J., Zhang X., Sun Y., Shao C., Liu Y. "Iron phthalocyanine/TiO_2 nanofiber heterostructures with enhanced visible photocatalytic activity assisted with H_2O_2" *J. Hazard. Mater*., **2012**, 219–220, 156-163.

S4 Mesgaria Z., Gharagozloub M., Khosravic A., Gharanjig K. "Synthesis, characterization and evaluation of efficiency of new hybrid Pc/Fe-TiO_2 nanocomposite as photocatalyst for decolorization of methyl orange using visible light irradiation" *Appl. Catal. A: Gen*., **2012**, 411-412, 139-145.

S5 Khatamian M., Hashemian S., Yavari A., Saket M. "Preparation of metal ion ($Fe^{3+}$and Ni^{2+}) doped TiO_2 nanoparticles supported on ZSM-5 zeolite and investigation of its photocatalytic activity" *Mater. Sci. Eng. B*, **2012**, 177, 1623– 1627.

S6 Shende T.P., Bhanvase B.A., Rathod A.P., Pinjari D.V., Sonawane S.H. "Sonochemical synthesis of Graphene-Ce-TiO_2 and Graphene-Fe-TiO_2 ternary hybrid photocatalyst nanocomposite and its application in degradation of Crystal Violet Dye", *Ultrasonic Chem*., Article accepted, https://doi.org/10.1016/j.ultsonch.2017.10.024.

S7 Huang M., Xu C., Wu Z., Huang Y., Lin J., Wu J. "Photocatalytic discolorization of methyl orange solution by Pt modified TiO_2 loaded on natural zeolite ", *Dyes Pigments*, **2008**, 77, 327-334.

S8 Rosu M.C., Coros M., Pogacean F., Magerusan L., Socaci C., Turza A., Pruneanu S. "Azo dyes degradation using TiO_2-Pt/graphene oxide and TiO_2-Pt/reduced graphene oxide photocatalysts under UV and natural sunlight irradiation", *Solid State Sci*., **2017**, 70, 13-20.

S9 Bel Hadjltaief H., Ben Zina M., Da Costa P., Gàlvez M-E., "Heterogeneous TiO_2–Fe-plate catalyst for the discoloration and mineralization of aqueous solutions of cationic and anionic dyes" *Desalin. Water Treat*. **2016**, 57, 13505-13517.

S10 Nezamzadeh-Ejhieha, A.; Karimi-Shamsabadib, M. "Comparison of photocatalytic efficiency of supported CuO onto microand nano particles of zeolite X in photodecolorization of methylene blue and methyl orange aqueous mixture" *Appl. Catal. A: Gen*. **2014**, 477, 83–92.