

Supporting Information

Synthesis and Characterization of micro / nano α -Fe₂O₃ for Photocatalytic Dye Degradation

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Supporting Information Figure S1: Tauc Plot of Fe₂O₃

Supporting Information Figure S2: Dye degradation Plot of Fe₂O₃ showing adsorption results

Supporting Information Figure S3: Photograph of bubbler used in photocatalytic experiments.

Supporting Information Figure S4: XRD Spectrum of Fe₂O₃

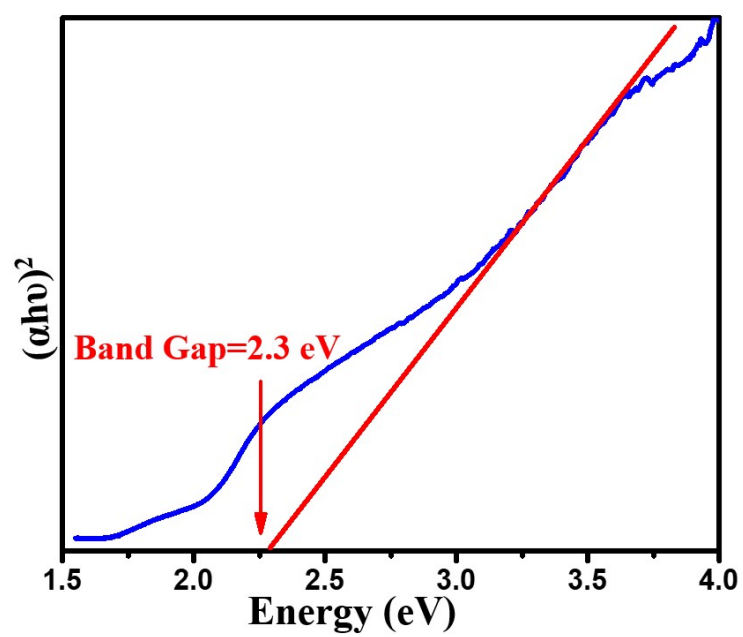
Supporting Information Figure S5: FTIR spectrum of Fe₂O₃

Supporting Information Tables:

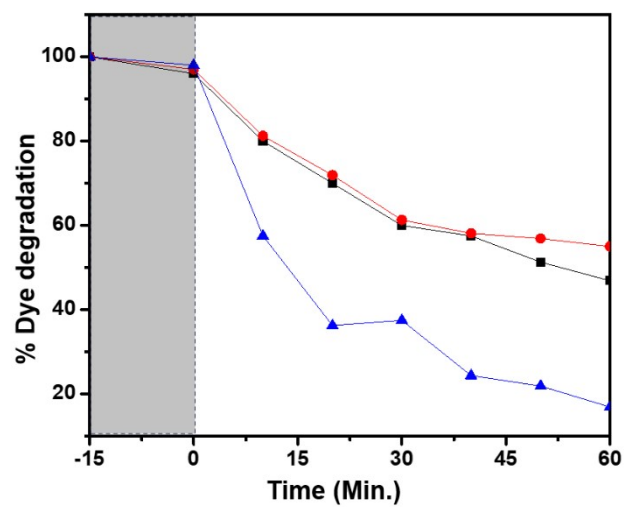
Supporting Information Table T1 Degradation of Rhodamine and crystal violet with Fenton reagent

Supporting Information Table T2 Degradation of organic pollutant with Fe₂O₃ through surface modification

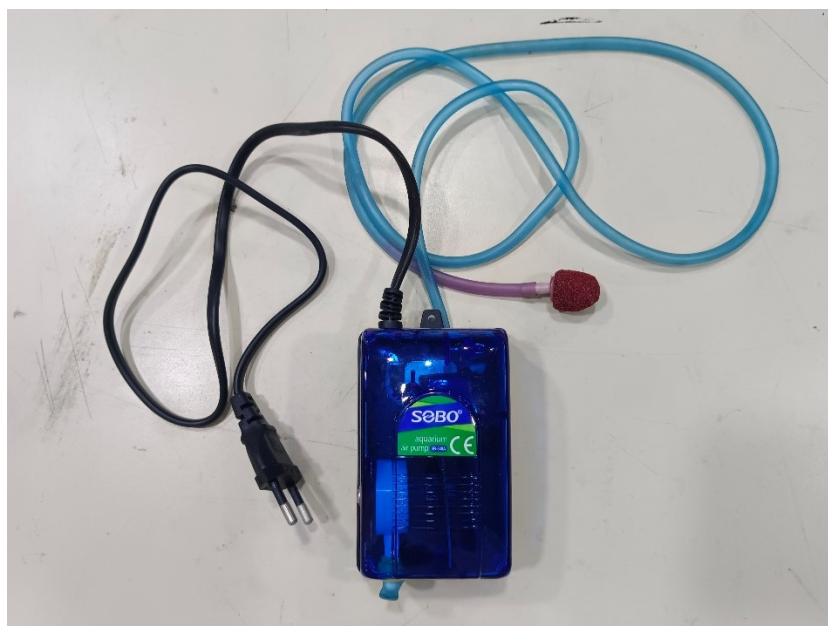
Supporting Information Table T3 Basic Information of Rhodamine 6G and Crystal violet dye



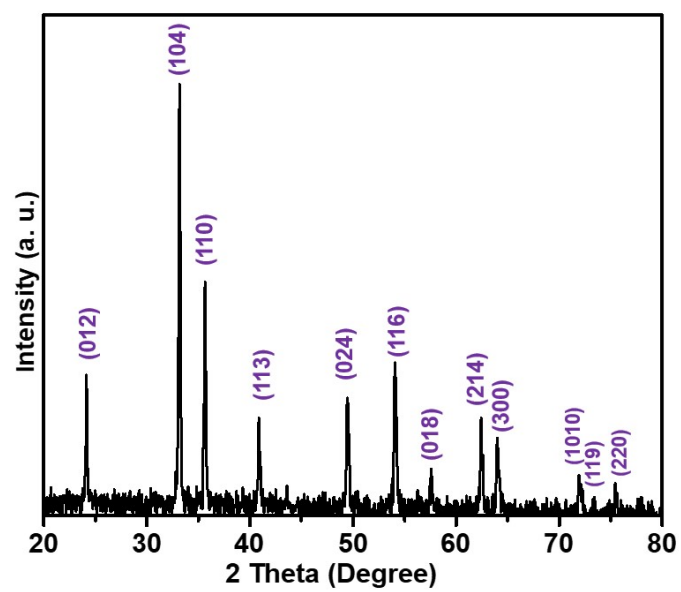
Supporting Information Figure S1: Tauc Plot of Fe₂O₃



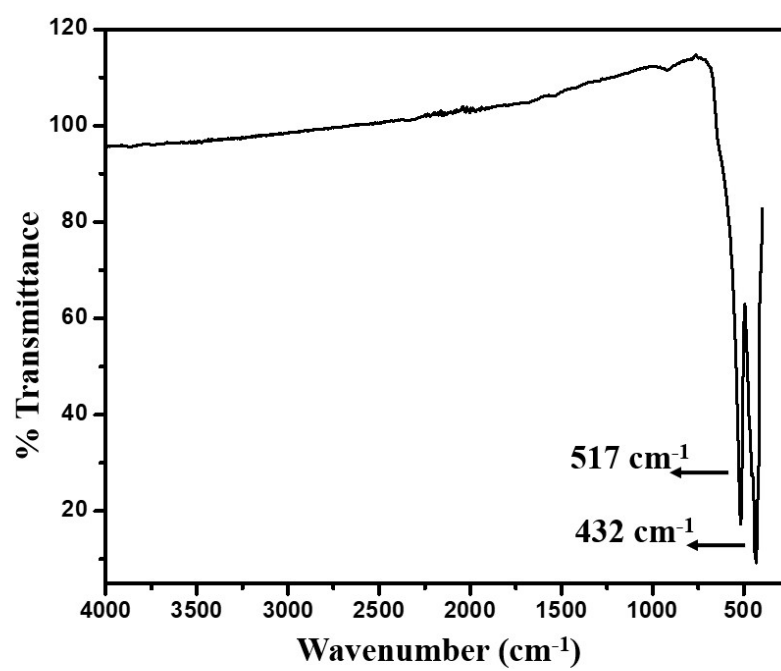
Supporting Information Figure S2: 10 ppm Dye degradation Plot of 50mg Fe_2O_3 showing in dark adsorption results. For photocatalytic degradation results with sunlight-Red, for UV lamp-Green and for bubbler-Blue coloration is used.



Supporting Information Figure S3: Photograph of bubbler used in photocatalytic experiments



Supporting Information Figure S4: XRD Spectrum of reused Fe₂O₃



Supporting Information Figure S5: FTIR spectrum of reused Fe₂O₃

Supporting Information Table T1 Degradation of Rhodamine and crystal violet with Fenton reagent

Method of preparation	Reaction condition	Dye Used and concentration	Rate of degradation	Ref.
Wet Chemical Approach	Fenton reagent	Rhodamine 25 ppm	0.0576 /min	1
Hydrothermal Method	Fenton reagent	Rhodamine 10ppm	0.2279/min	2
Green Synthesis	Fenton reagent	Crystal Violet 10ppm	0.008/min	3
Solution Blow Spinning	Fenton reagent	Crystal Violet 5ppm	0.0018/min	4
Sol-Gel auto combustion	Without Fenton reagent	R6G and CV 10ppm	0.0078/min	Present Study

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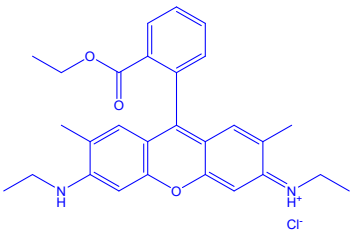
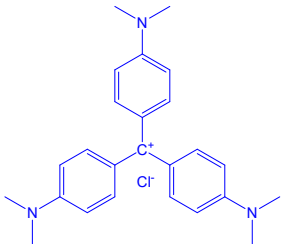
Supporting Information Table T2 Degradation of organic pollutant with Fe₂O₃ through surface modification

Synthesis Method	Photocatalyst	Dye Degradation	Degradation Time	Ref.
Solvothermal	Fe ₂ O ₃	Rhodamine	90 min	1
Hydrothermal	Fe ₂ O ₃	Rhodamine	180 min	2
Thermal Dehydration	Fe ₂ O ₃	Rhodamine	120 min	3
Seed Planting	Fe ₂ O ₃ /CdS	Methylene Blue	420 min	4
Precipitation by Polyol Method	Pt/ Fe ₂ O ₃	Methylene Blue	120 min	5
Sol-Gel Method	Fe ₂ O ₃	Malachite Green	120 min	6
Sol-Gel auto combustion	Fe ₂ O ₃	R6G and CV	60 min	Present Study

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Supporting Information Table T3 Basic Information of Rhodamine 6G and Crystal violet dye

Name of Dye	Rhodamine 6G dye	Crystal violet dye
Structure		
Molecular Formula	$C_{28}H_{31}N_2O_3Cl$	$C_{25}H_{30}ClN_3$
Molecular Mass	479.02 g / mol	407.99 g/mol
Melting Point	215°C	205°C
Solubility in Water	20 g / cm ³	04 g / cm ³
Density	1.26g / cm ³	1.19 g / cm ³
Colure	Bronze / Red	Blue -violet
Absorbance	535-545 nm	590 nm
Solvent	Methanol, Ethanol	Chloroform, Alcohol and Glycerol
Applications	1) R6G is widely used in biotechnology applications. 2) These are used in lasers.	1) It is used to colorize fertilizer, antifreeze, detergent. 2) It is used to determine the fingerprints.