

## Two Cobaltous PCPs: Rapid Catalytic Degradation of POPs Coupled with Remarkable Antibacterial and Antifungal Properties

Shyam Goswami,<sup>a</sup> Sourajyoti Ray,<sup>a</sup> Kaushik Kumar Bharadwaj,<sup>b</sup> Soma Majumder,<sup>a</sup> and Sanchay Jyoti Bora<sup>a\*</sup>

<sup>a</sup> Department of Chemistry, Pandu College, Guwahati-781012, Assam, India

<sup>b</sup> Department of Computational Biology and Biotechnology, Mahapurush Srimanta Sankardeva Viswavidyalay, Guwahati unit, Rupnagar, Guwahati-781032, Assam, India.

\* Corresponding author e-mail id- [sanchay.bora@gmail.com](mailto:sanchay.bora@gmail.com)

Sl. No.	Contents	Pg. No.
S1	FT-IR spectra of <b>1</b> and <b>2</b>	1
S2	UV-DRS spectra of <b>1</b> and <b>2</b>	2
S3	TGA pattern of <b>1</b> and <b>2</b>	2
S4	TGA pattern of <b>1</b> and <b>2</b>	3
S5	GC-MS data of MG degradation	4
S6	Degradation spectra of other dyes with <b>1</b> and <b>2</b>	5
S7	Degradation spectra of other mixture of dyes and <b>1</b> and <b>2</b>	6
S8	Structure of the dyes and nitroaromatics used in this work	7
S9	Reusability test of the catalyst <b>1&amp;2</b>	8

### S1: FT-IR spectra of **1** and **2**

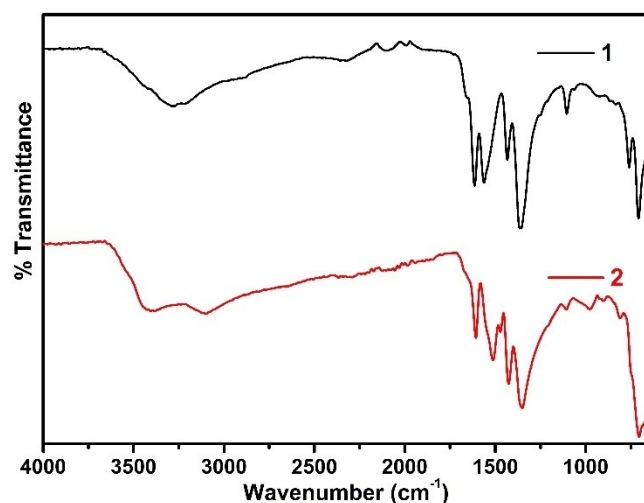
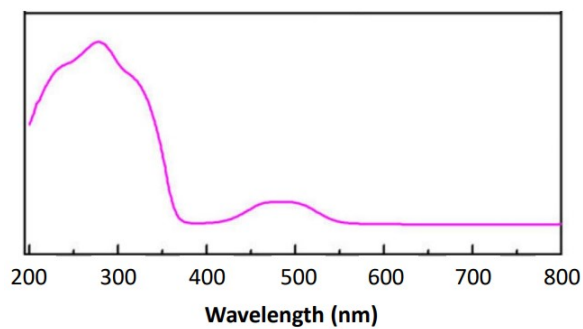
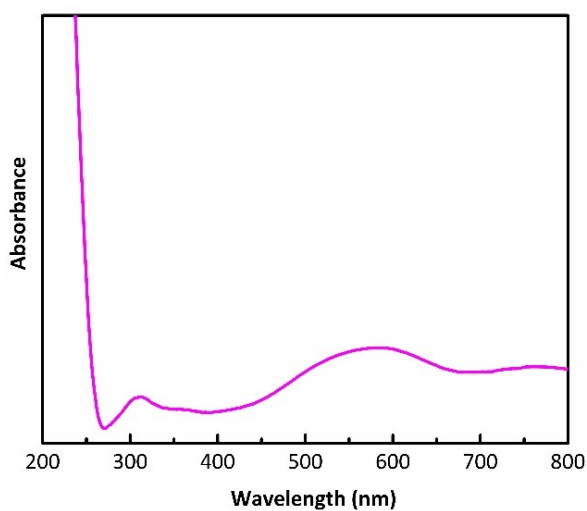


Fig. S1 FT-IR spectra of **1** and **2**

## S2: UV-DRS spectra of 1 and 2



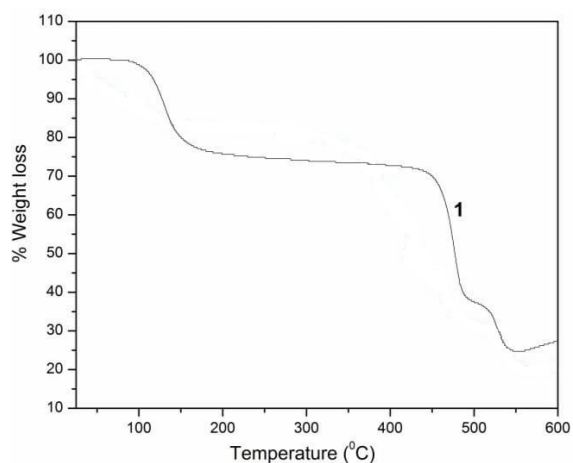
(a)



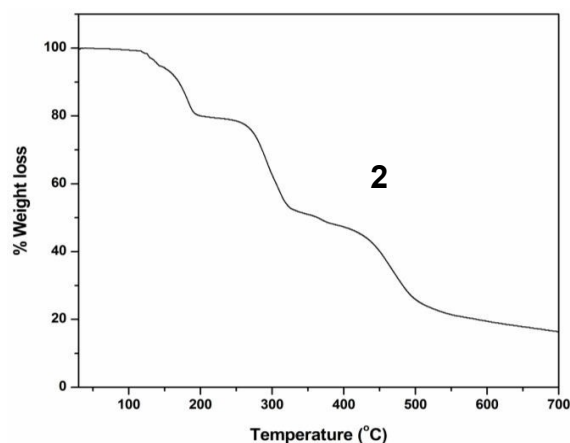
(b)

Fig. S2 UV-DRS spectra of (a) 1 and (b) 2

## S3: Thermogravimetric analysis of 1 and 2



(a)

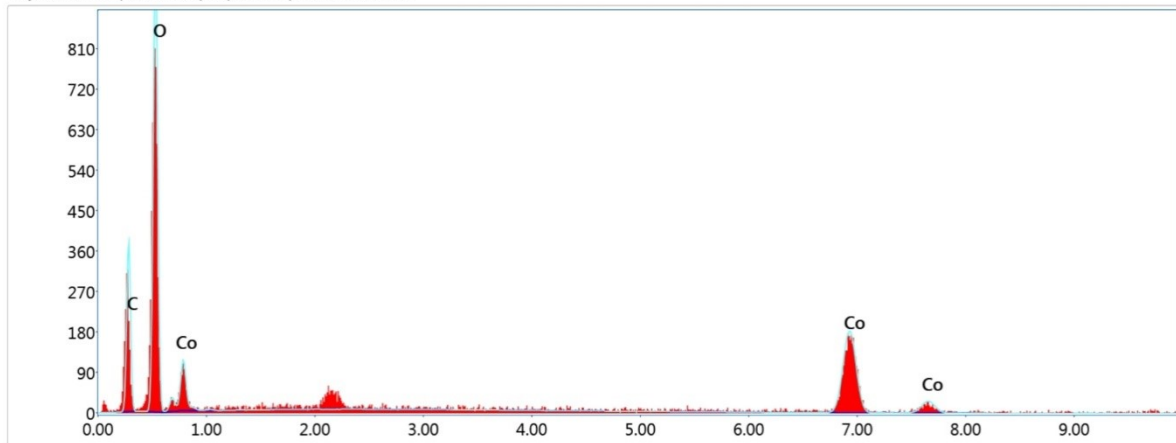


(b)

Fig. S3 TGA patterns of (a) 1 and (b) 2

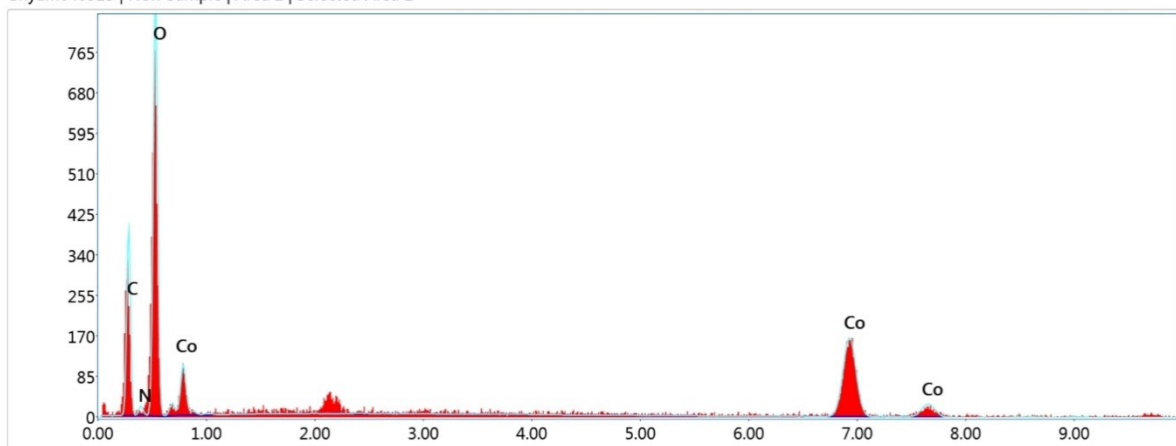
### S4: EDX spectra of 1 and 2

Shyam040923 | New Sample | Area 1 | Selected Area 1



(a)

Shyam040923 | New Sample | Area 2 | Selected Area 1



(b)

Fig. S4 EDX spectra of (a) 1 and (b) 2

## S5: GC-MS analyses of degradation of MG using 1 and 2

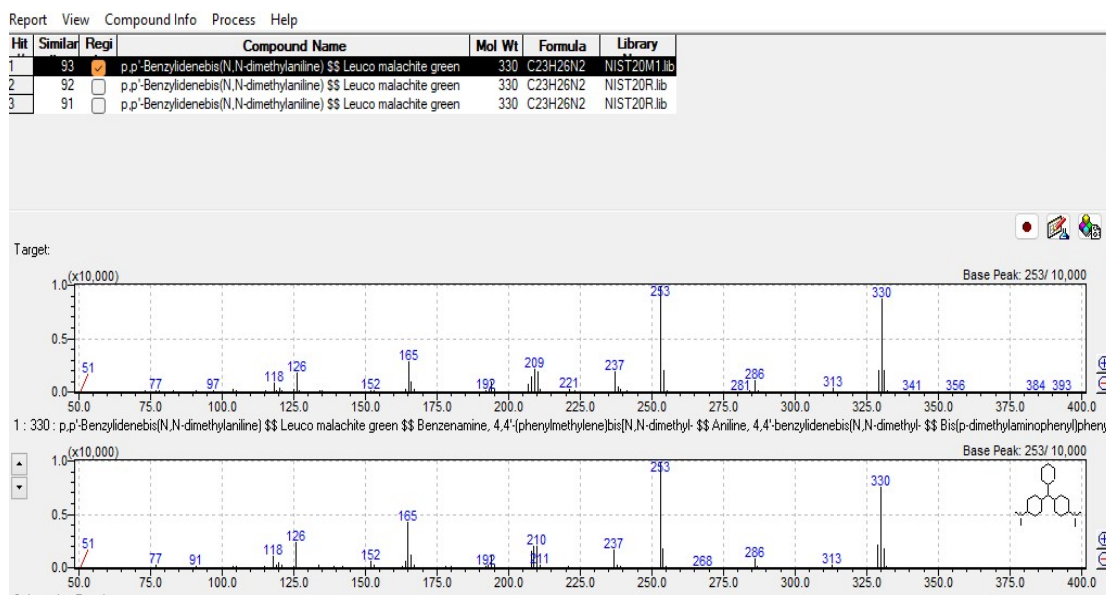


Fig.S5 (a) Shows the Library search result of the sample using NIST 20

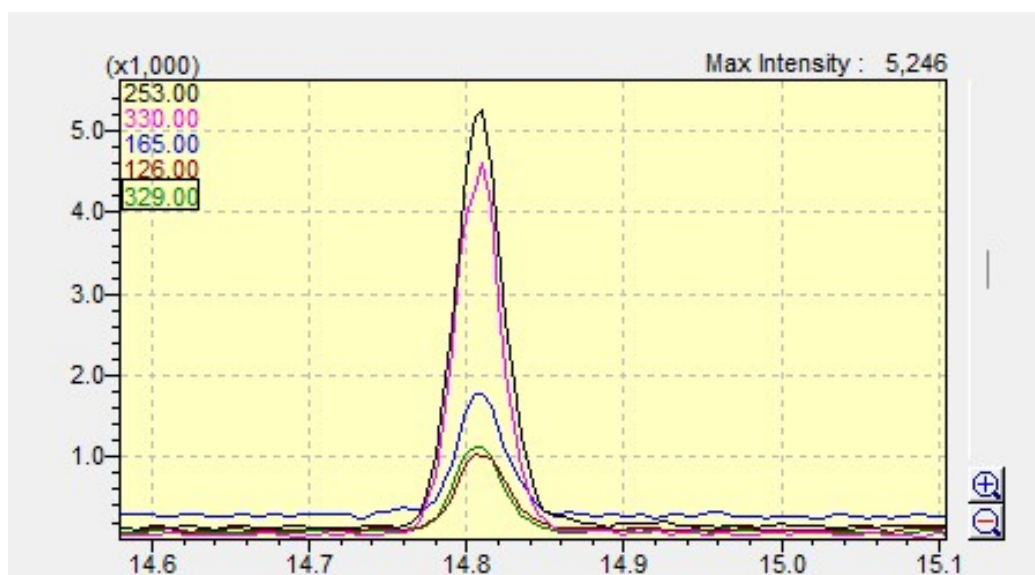


Fig. S5 (b) m/z value of Extracted Ion Chromatogram for detected compound

S6: Degradation spectra of individual dyes using 1 and 2

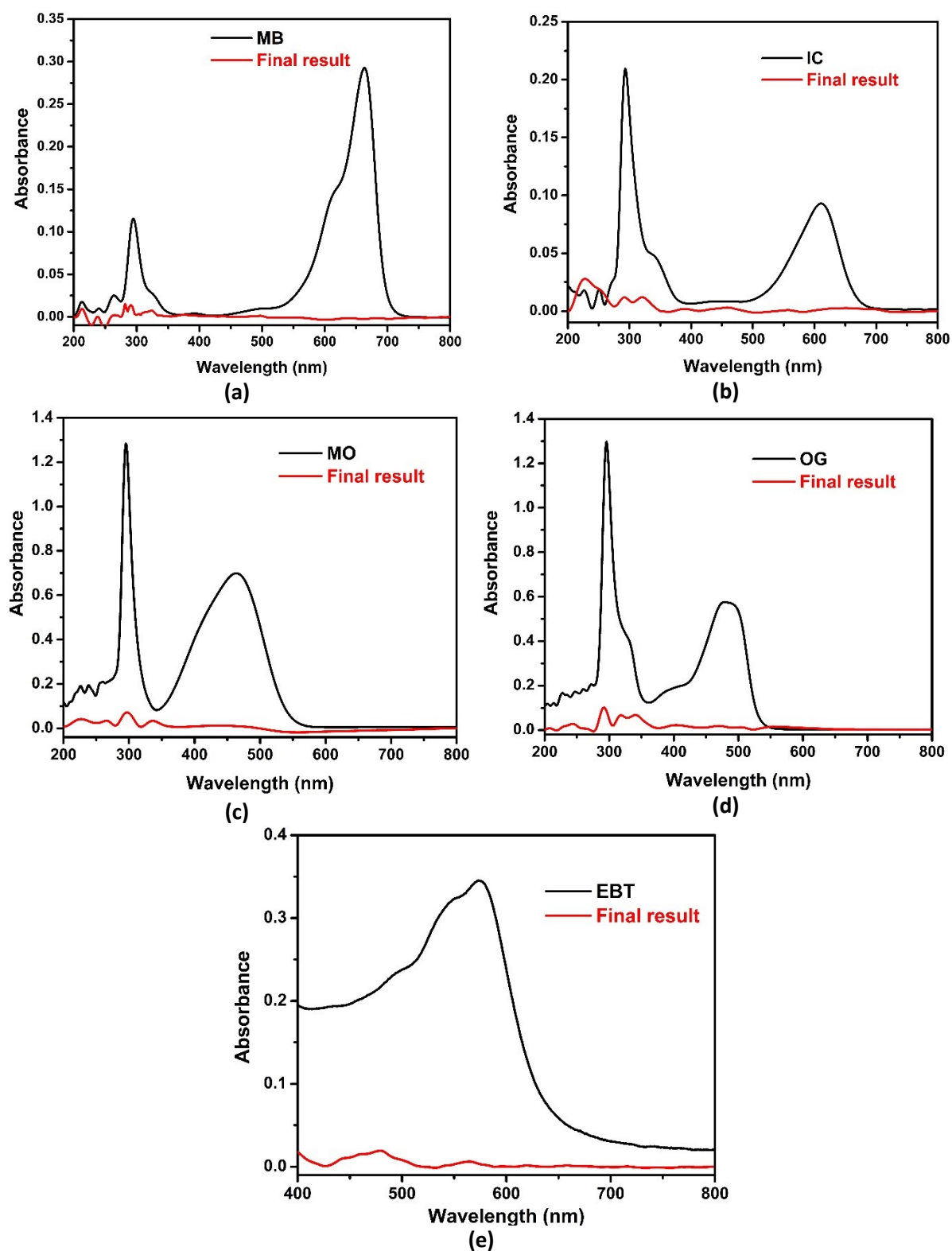
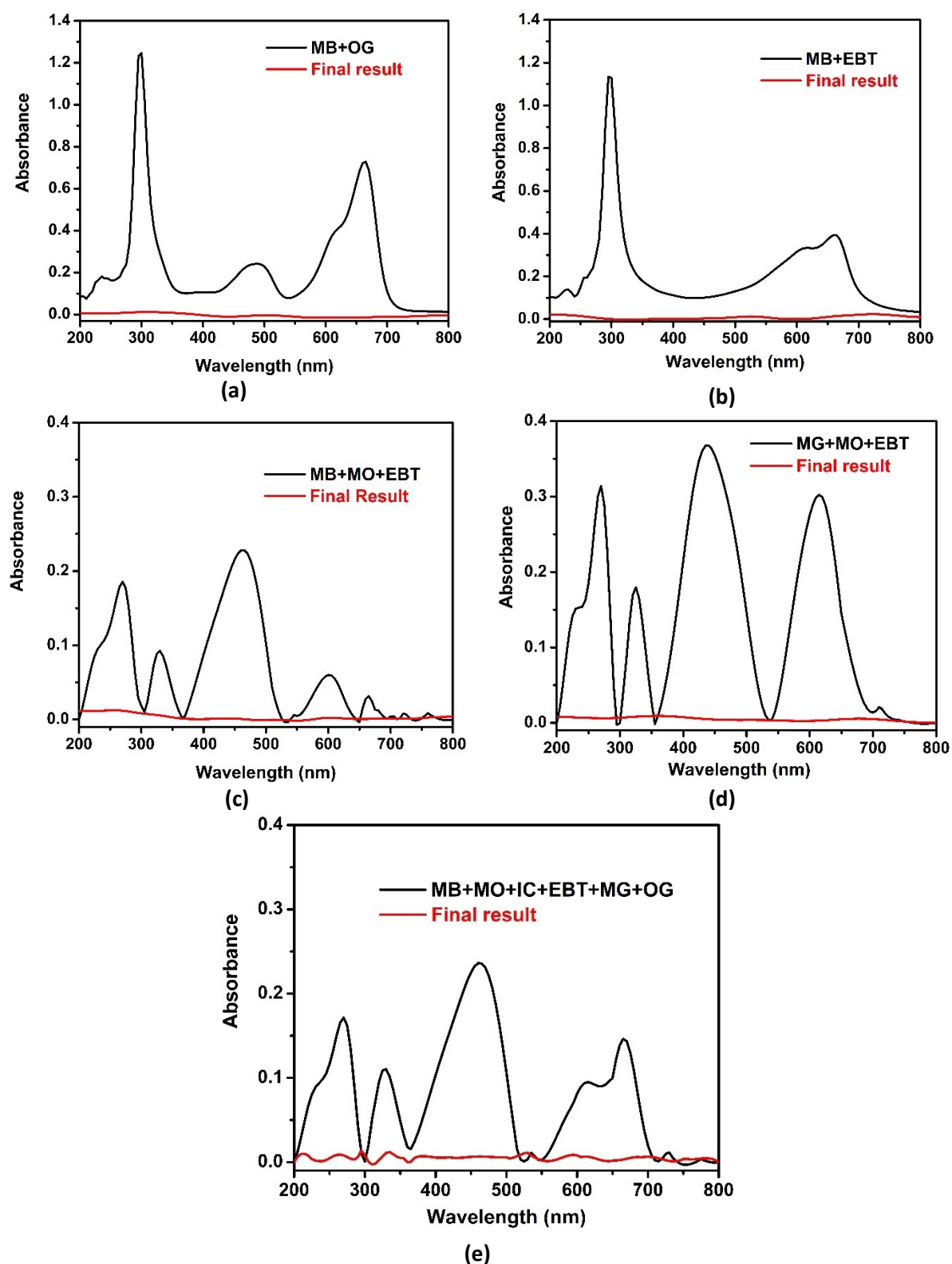


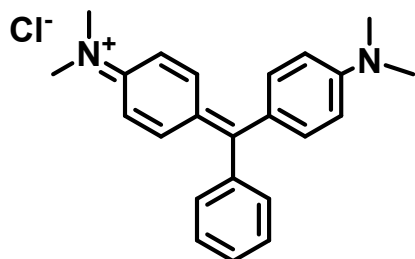
Fig. S6 Degradation spectra of (a) MB, (b) IC, (c) MO, (d) OG and (e) EBT using 1 and 2

**S7: Degradation spectra of mixture of dyes using 1 and 2**

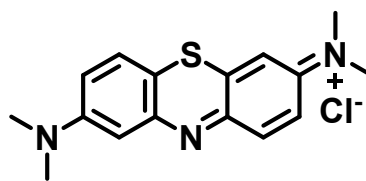


**Fig. S7** Degradation spectra of binary mixture (a) MB+ OG, (b) MB+EBT, ternary mixture (c) MB+MO+EBT, (d) MG+MO+EBT and (e) all six dyes of our investigation using 1 and 2

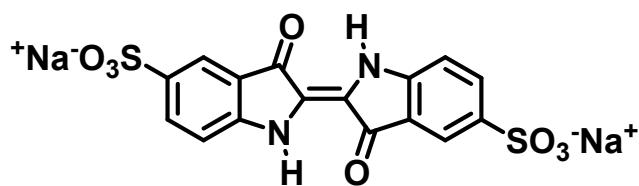
S8: Structure of the dyes and nitroaromatics used in this work



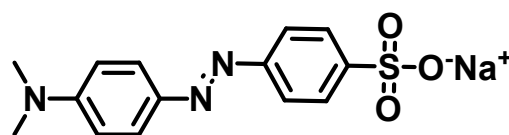
Malachite Green



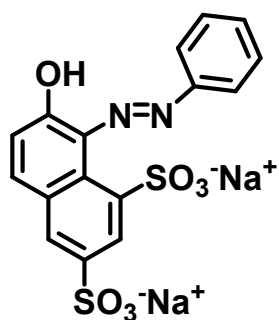
Methylene Blue



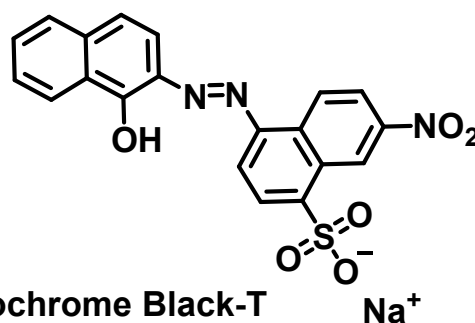
Indigo Carmine



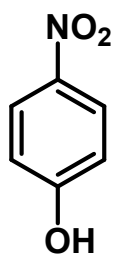
Methyl Orange



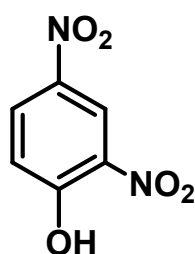
Orange G



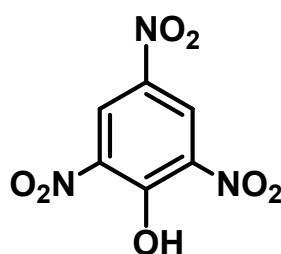
Eriochrome Black-T



4-Nitrophenol



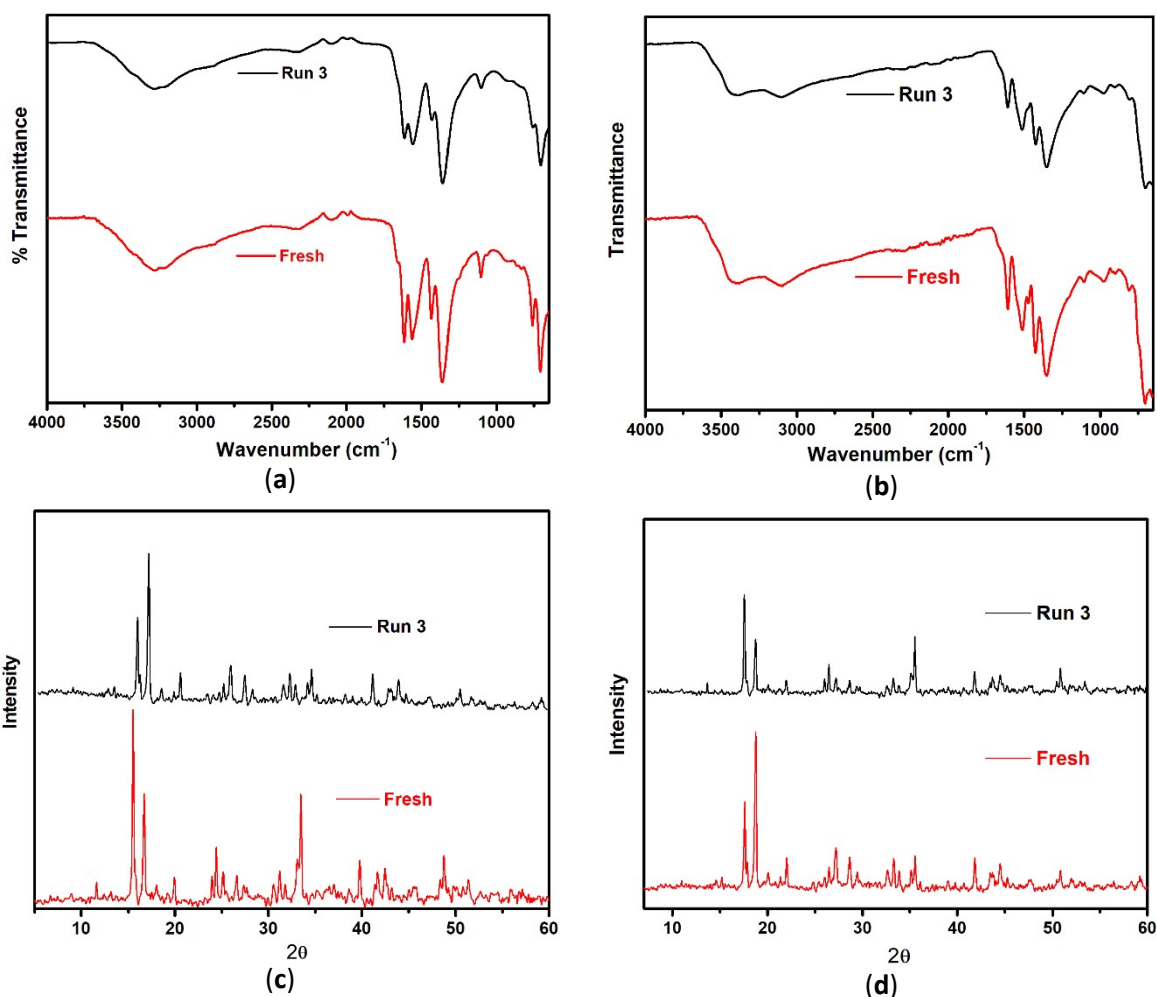
2,4-dinitrophenol



2,4,6-trinitrophenol

Fig. S8 Structure of dyes and nitroaromatics used in this work

### S9: Reusability test of the catalysts 1 & 2



**Fig. S9** Test of the heterogeneous nature of the catalyst **1&2** after 3<sup>rd</sup> run (a) FT-IR of fresh and reused **1**; (b) FT-IR of fresh and reused **2**; (c) PXRD of fresh and reused **1**; (d) PXRD of fresh and reused **2**.