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Supporting Information

Facile One-pot synthesis of waste copper phthalocyanine-derived nanocomposite for efficiently removing dyes from wastewater.

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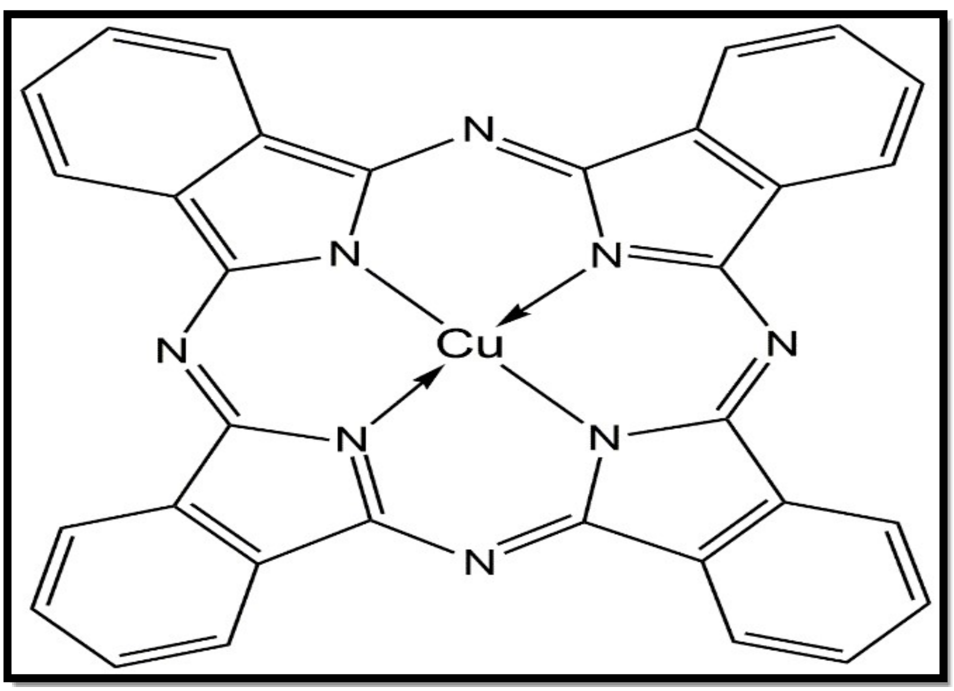


Fig.S1. Structure of Copper Phthalocyanine dye.

Fig.S2. Digital image of AC/Ppy/CuPC nanocomposite

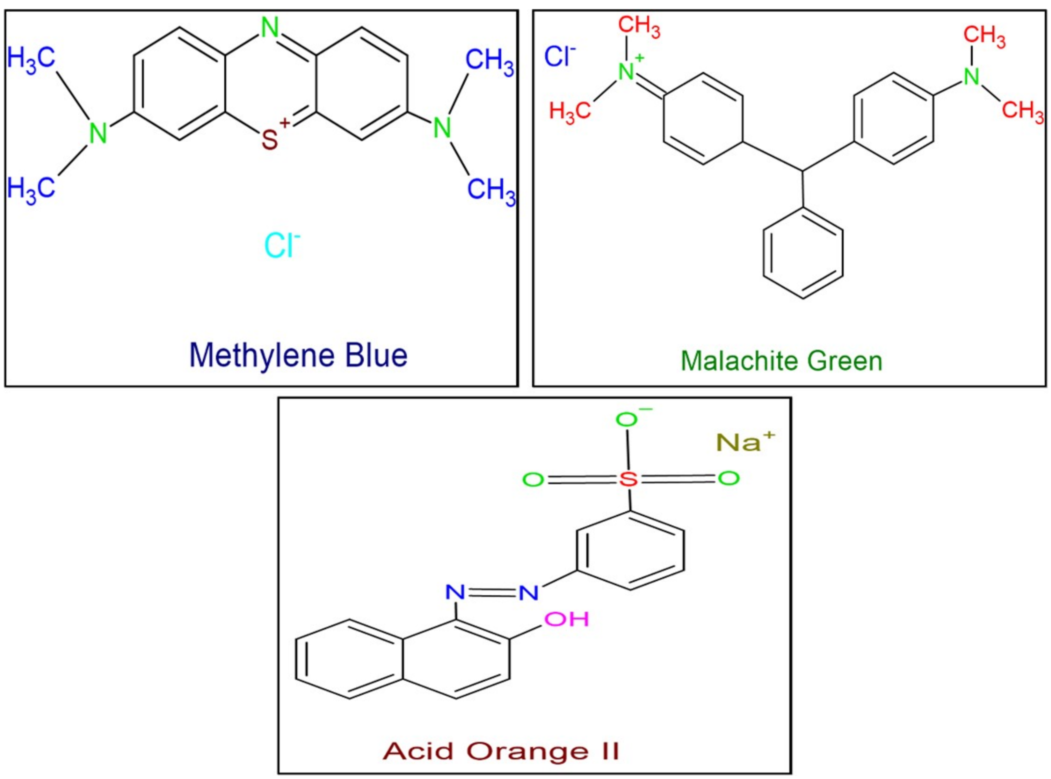


Fig.S3 Chem draws a representation of the dyes that have been efficiently removed.

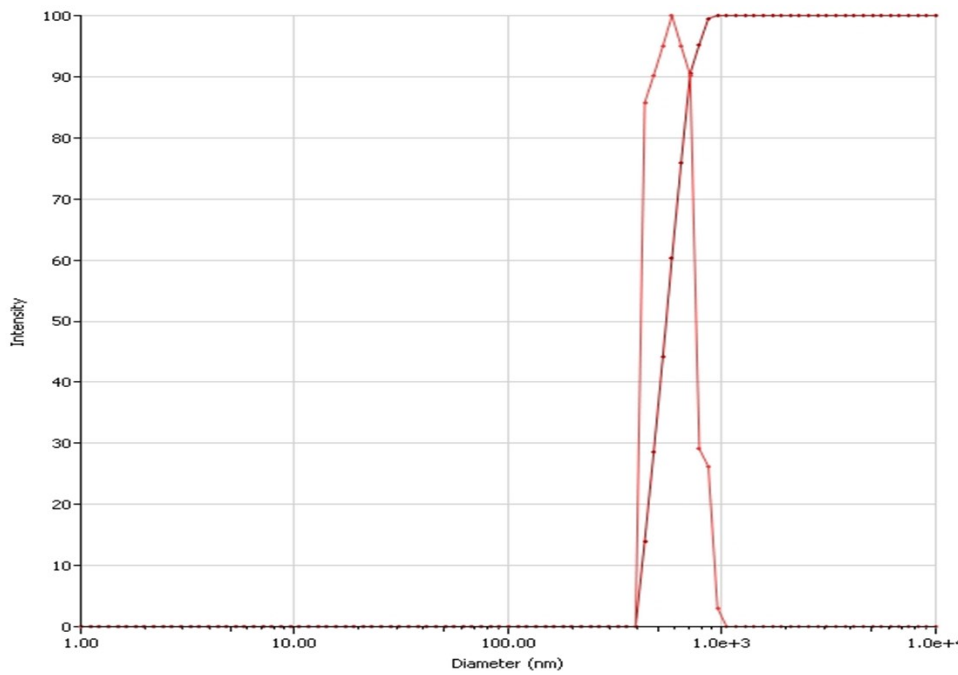


Fig.S4. Particle size distribution of AC/Ppy/CuPc nanocomposite

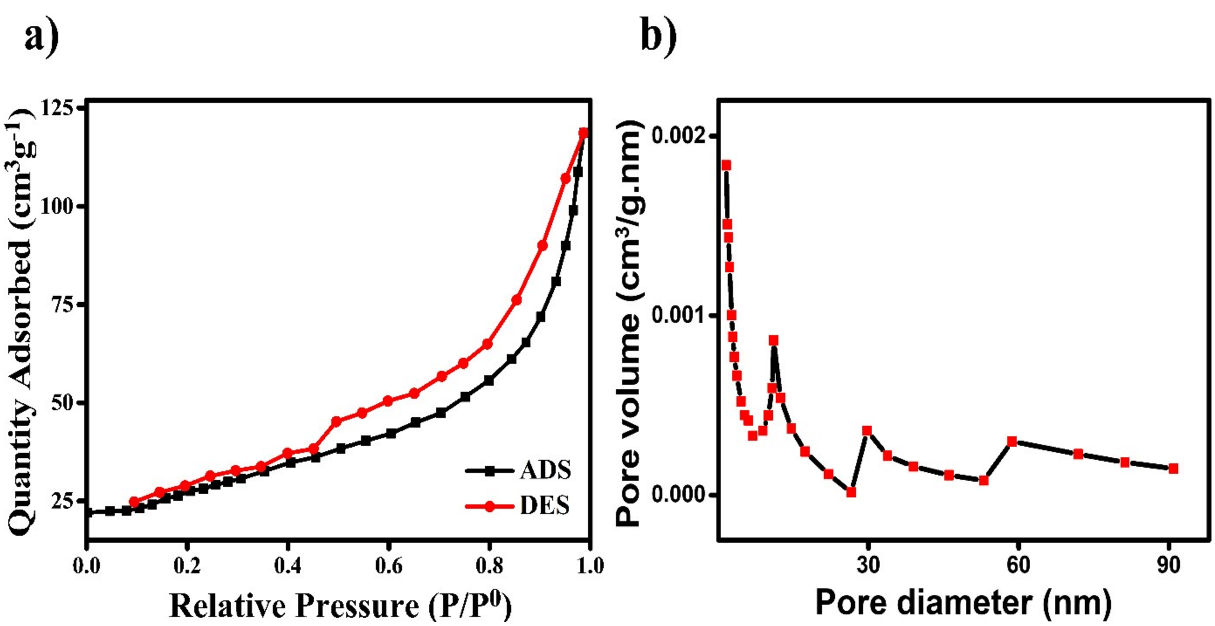
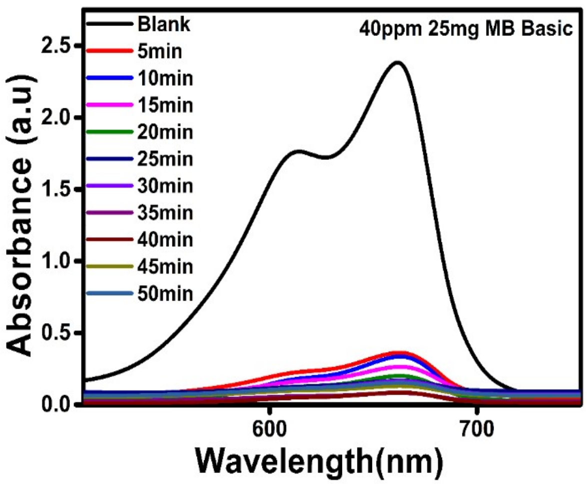


Fig.S5. a) N_2 adsorption-desorption isotherm and **b)** Pore size distribution curve of AC/Ppy/CuPc



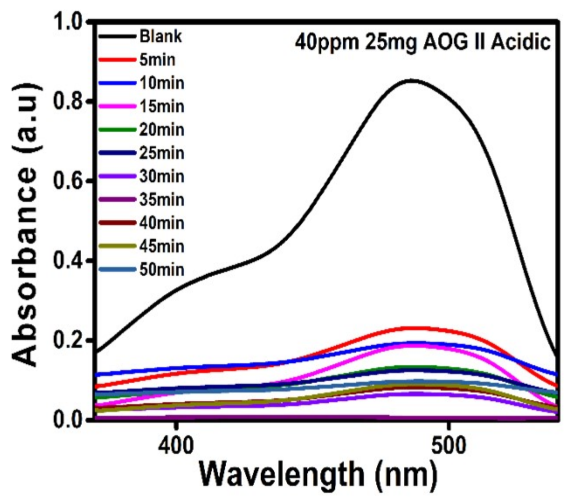


Fig S6. Effect of contact time on the adsorption of MB and AOG II dye onto AC/Ppy/CuPc nanocomposite: Mass of adsorbent = 25 mg, Volume of MB solution = 50 ml, Initial dye Concentration = 40 ppm, Temperature = 50°C

Fig.S7. Pictorial representation of before and after 35 mins of contact time of MB, MG and AOG II with AC/Ppy/CuPc nanocomposite

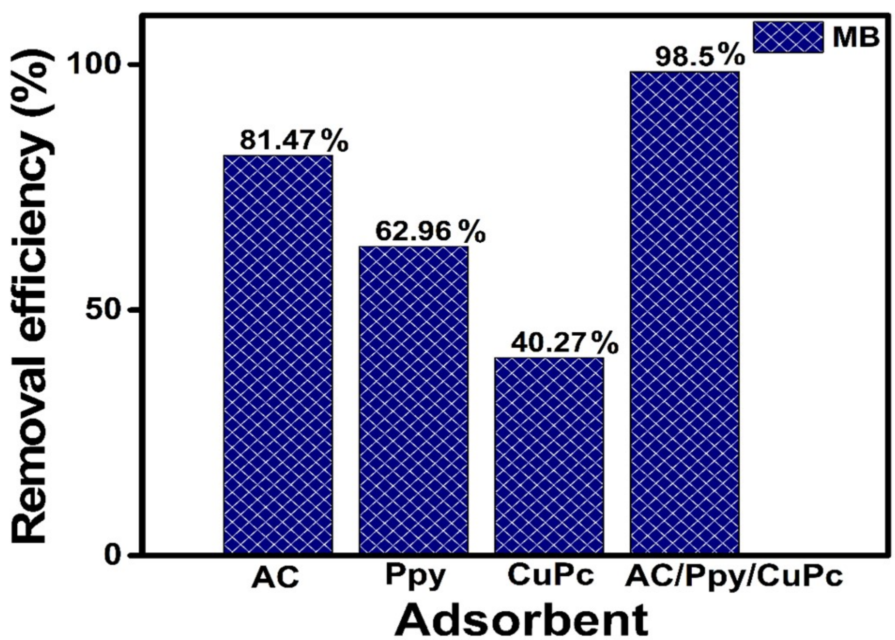


Fig S8. Percent adsorption of MB using AC, Ppy, CuPc and AC/Ppy/CuPc adsorbents

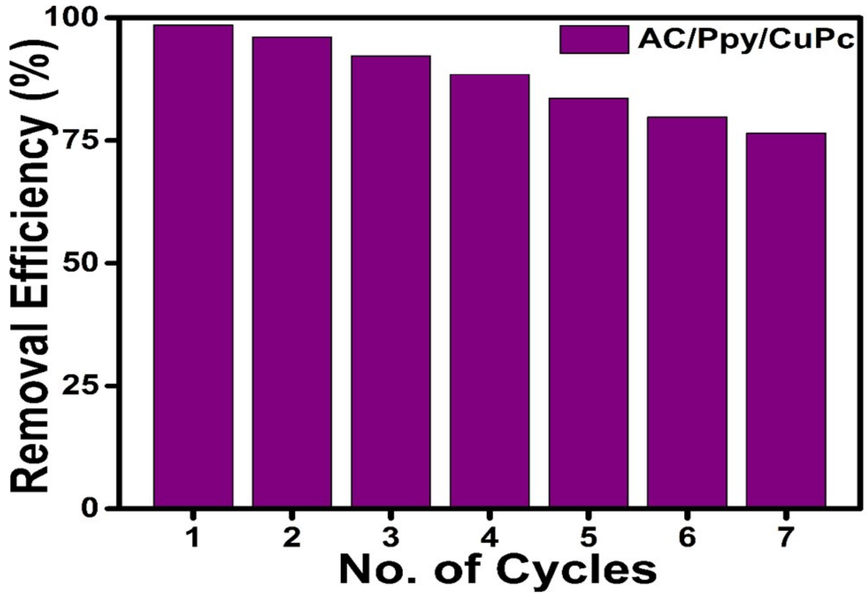


Fig S9. Recyclability data (%) of MB on AC/Ppy/CuPc composite during 7 adsorption cycles.

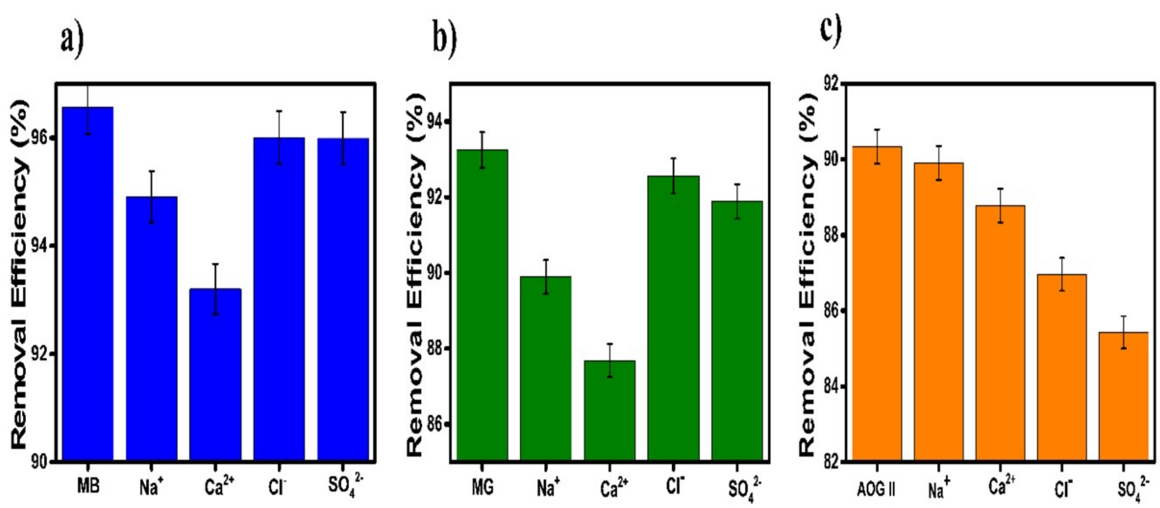


Fig S10 a), b), and c) effect of ions on the removal of MB, MG, and AOG II dyes using AC/Ppy/CuPc nanocomposite, respectively.

Table S1. Toxic effects and application of dyes.

Type of dye	Name of dye	Toxic effects	Application	Ref
Anionic	Acid orange II	Upper respiratory tract irritations; severe headaches, dizziness, nausea, and loss of bone marrow leading to anaemia. It is carcinogenic in nature and can lead to tumours.	It is extensively used for dying a variety of materials such as nylon, aluminium, Detergents, cosmetics, wool, and silk.	[1]
Cationic	Methylene blue	Eye burn, breathing problems with a burning sensation, vomiting, nausea, and profuse sweating	Colouring of silk, cotton, and wood.	[2]
	Malachite green	Damages the kidneys, heart, and liver Lesions on the eyes, skin, lungs, and bones.	Colouring cotton, paper, jute, silk, wool, acrylic, and leather products. It is also used for colouring food agents, food additives, medicinal disinfectants, commercial fish-hatching industries	[2]

Table S2: Pseudo first and second order kinetics models for the adsorption of MB dye on AC/Ppy/CuPc at 50˚C.

Concentration (ppm)	Pseudo-first order			Pseudo-second order		
	q_e (mg/g)	k_1	R^2	q_e (mg/g)	k_1	R^2
20	0.3250	0.1248	0.0842	53.4759	0.0168	0.9986
30	1.8593	0.0083	0.0125	55.8659	0.1104	0.9920
40	0.0288	0.1538	0.4775	85.4700	0.0092	0.9960
50	0.0085	0.1605	0.3393	60.2409	0.0231	0.9638

Table S3. Pseudo first and second order kinetics models for the adsorption of MG dye on AC/Ppy/CuPc at 50˚C.

Concentration (ppm)	Pseudo-first order			Pseudo-second order		
	q_e (mg/g)	k_1	R^2	q_e (mg/g)	k_1	R^2
20	6.0325	0.0336	0.103	34.72222	0.095338	0.999
30	0.4472	0.1075	0.0724	64.10256	0.017383	0.999
40	0.1017	0.1409	0.2839	47.16981	0.007214	0.9857
50	0.5787	0.0852	0.0521	34.01361	0.036625	0.9917

Table S4: Pseudo first and second-order kinetics models for the adsorption of AOG II dye on AC/Ppy/CuPc at 50°C.

Concentration (ppm)	Pseudo-first order			Pseudo-second order		
	q_e (mg/g)	k_1	R^2	q_e (mg/g)	k_1	R^2
20	0.8974	-0.1082	0.2684	36.9004	0.0556	0.9652
30	0.00017	0.3740	0.5206	71.94	0.0070	0.9756
40	0.0326	0.1568	0.4604	90.0901	0.0067	0.9951
50	0.0087	0.1515	0.4203	84.7457	0.0070	0.9951

Table S5. Removal capacity of various adsorbents for MB, MG and AOG II

Composite	Conc (mg/L)	Dose (g)	Volume (ml)	Percent efficiency (%)	q_e (mg/g)	Dyes	Contact time (mins)	Ref
PPy-coated cotton textile	50	0.05	50	96	6.83	MB	1440	(3)
($CuPc/Fe_3O$)	50	0.05	50	78.7	-	MB	120	(4)
Ball clay – Manganese dioxide nanocomposite	10	0.8	50	82	58.47	MG	70	(5)
Activated carbon produced from Parthenium hysterophorus stem	100	2	100	91	11.37	MB	100	(6)
AC/PPY/ CuPc	40 30 40	0.025	50	98.50 95.85 93.67	135.13 94.34 106.3	MB MG AOG II	35	This study

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