Supplementary Information for

Bisphenol A removal through low-cost kaolin-based $Ag@TiO_2$ photocatalyst ceramic hollow fiber membrane from the liquid media under visible light irradiation

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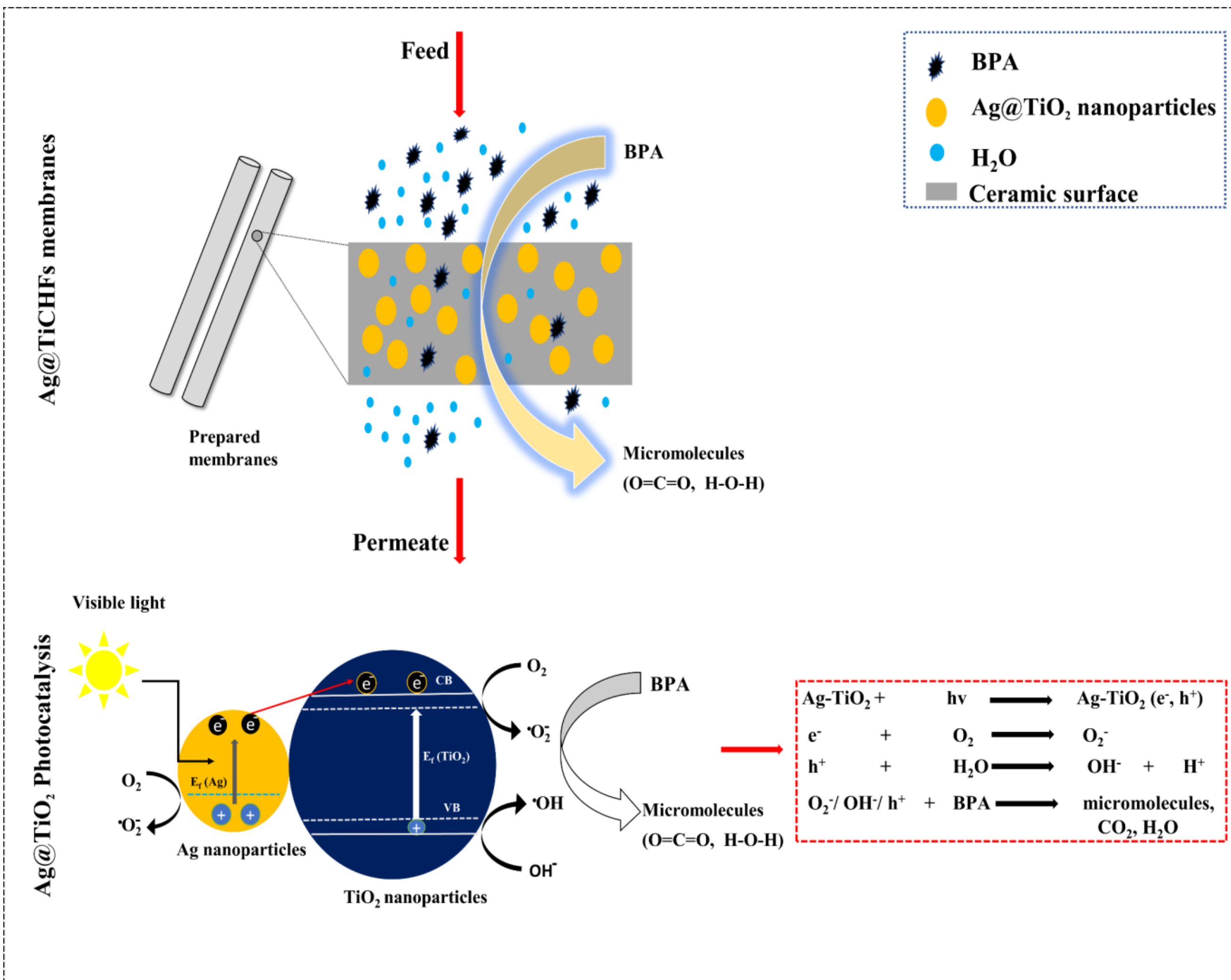
The supplementary information has five figures and five tables.

Graphical Abstract

The Ag-doped TiO_2 hollow fiber ceramic membrane (Ag@TiCHF) was fabricated through dip coating method followed by synthesis of Ag@TiO_2 photocatalyst for the efficient removal of bisphenol A (BPA). The photocatalytic BPA removal efficiency of acquitted membrane (Ag@TiCHF) and Ag@TiO_2 photocatalyst was 90.51% and 93.22 %, respectively within 180 min under visible light irradiation.



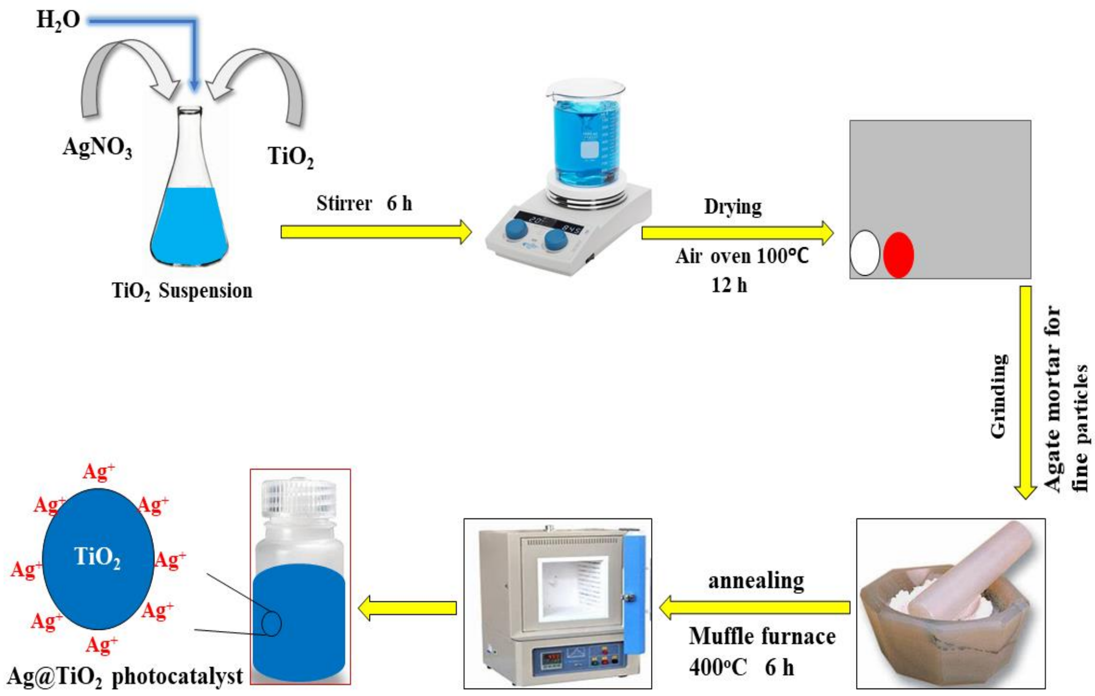


Fig. S1 Illustration of Ag@TiO_2 nanoparticles

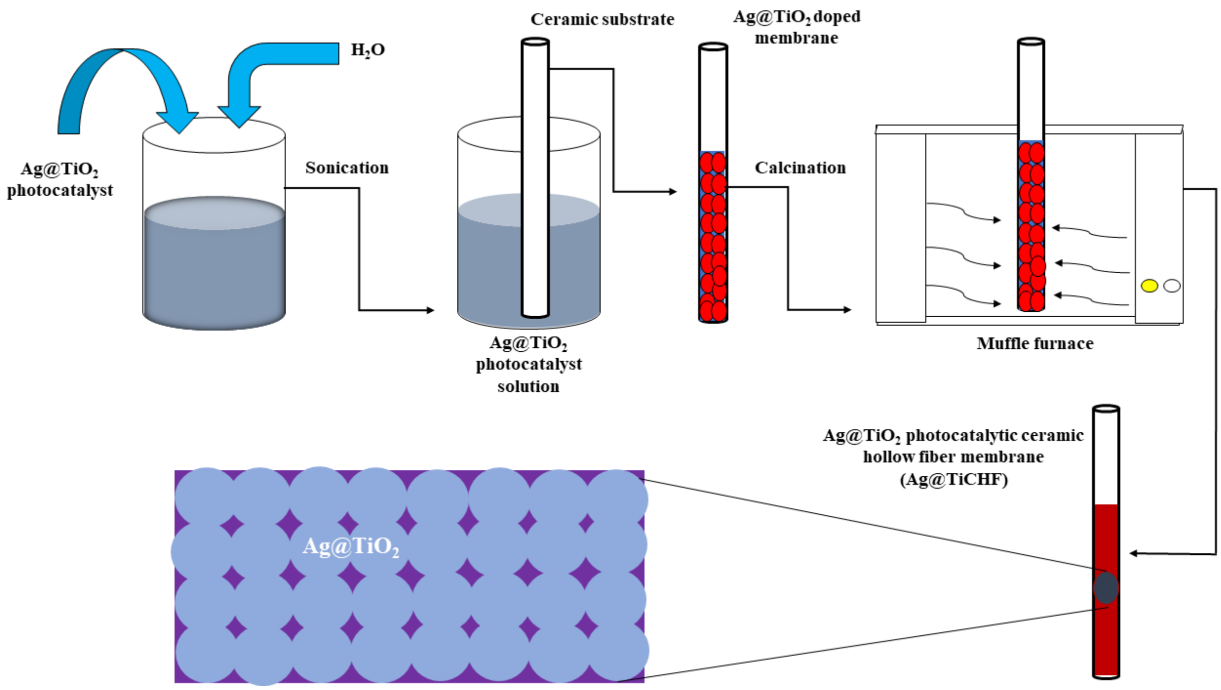


Fig. S2 Modification of ceramic hollow fiber membrane

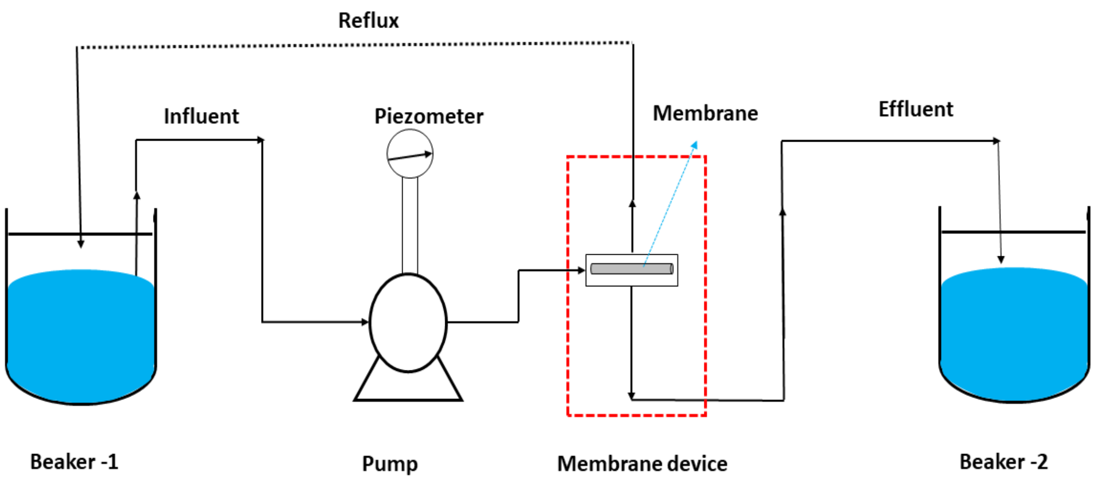


Fig. S3 Pure water flux calculation of membrane device

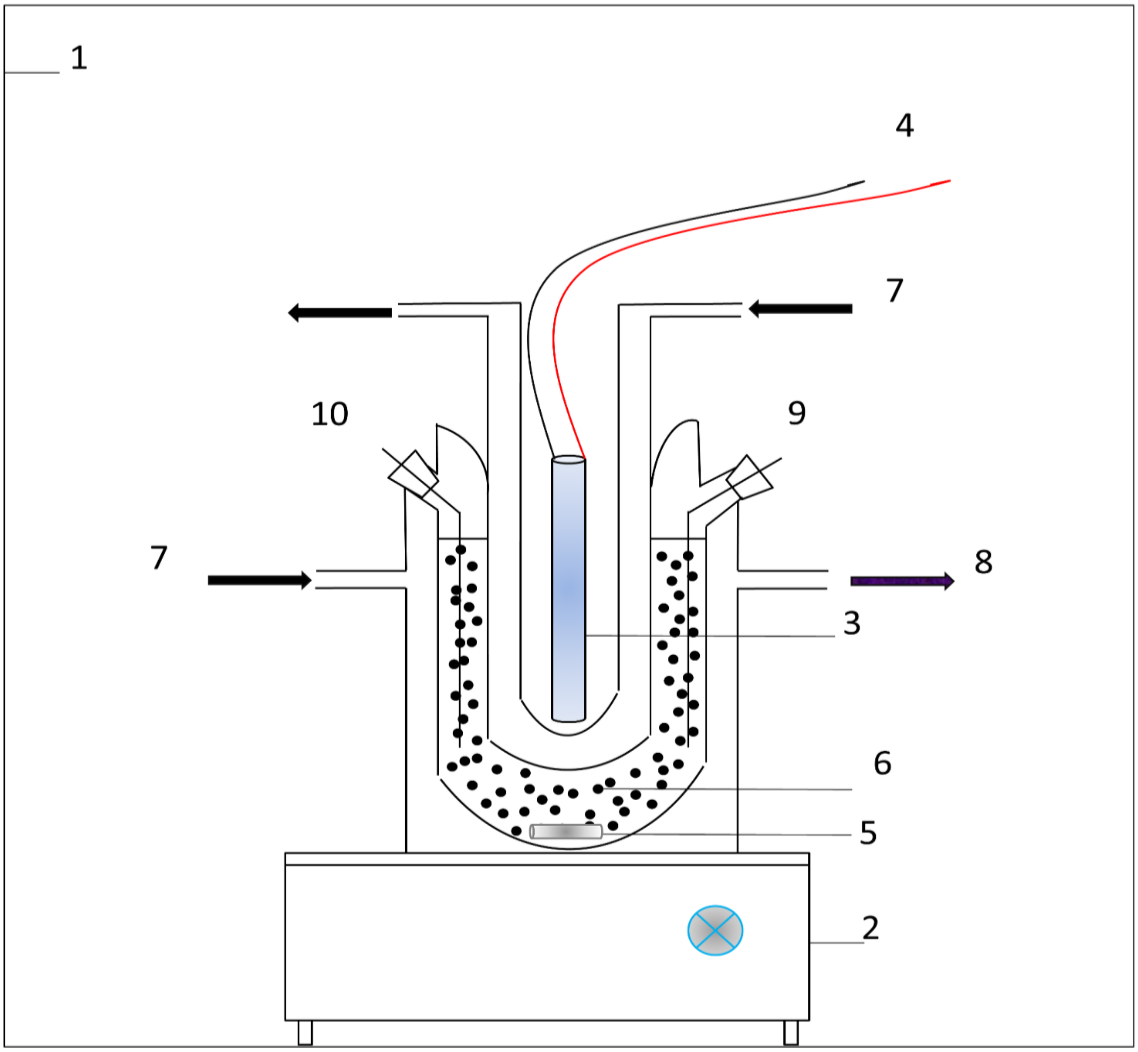


Fig. S4 Photocatalytic reactor

(1. Metal shield; 2. Magnetic stirrer; 3. Xenon lamp; 4. Electrical source; 5. Rotor;

6. Solution; 7. Cooling water in; 8. Circulating water out; 9. Gas in; 10. Sampling port.)

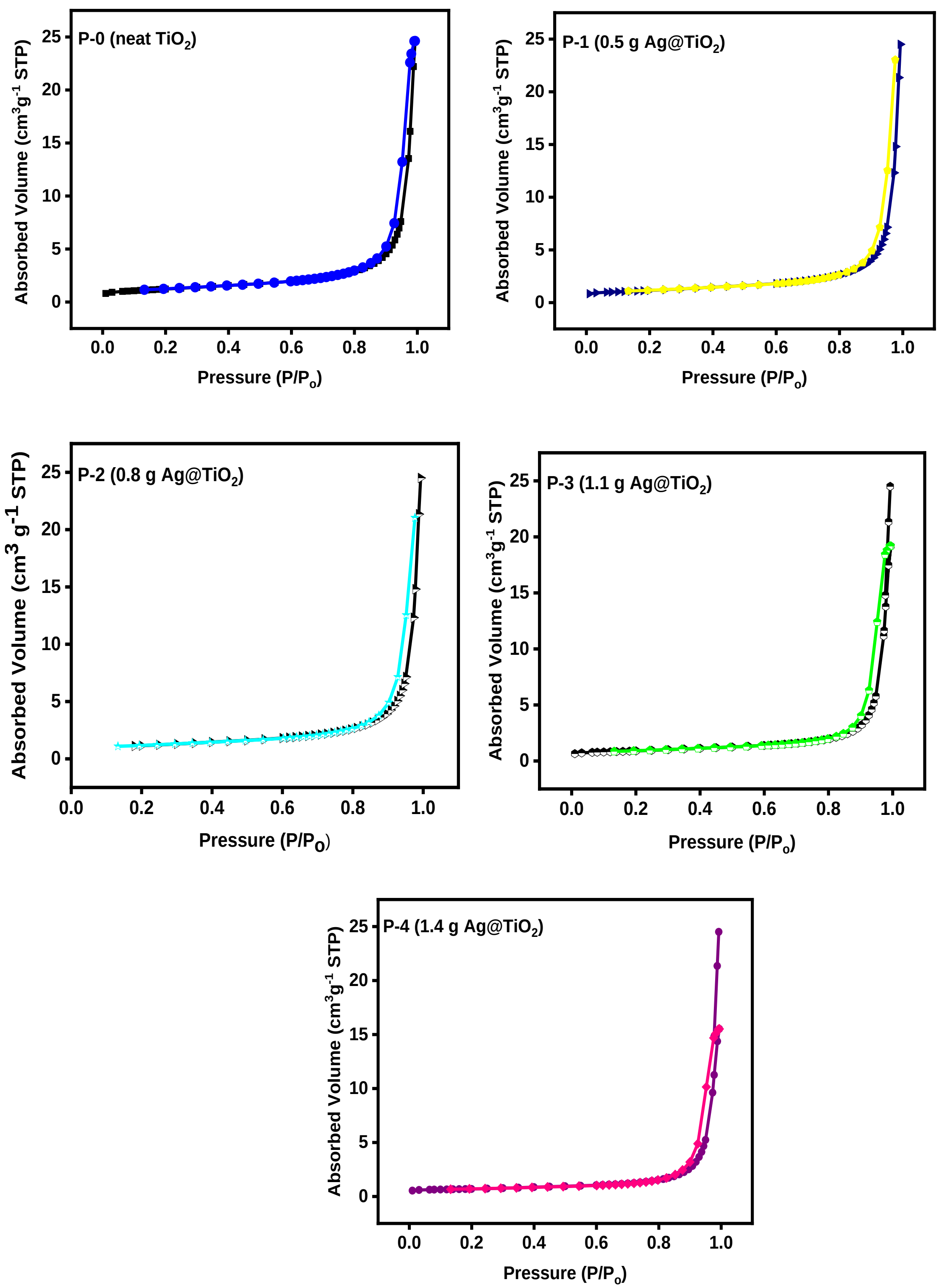


Fig. **S5** BET graphs of $Ag@TiO_2$ nanoparticles.

Table S1 Composition for the preparation of Ag@TiO_2 nanoparticles

Sample	TiO_2 (g)	$AgNO_3$ (g)	H_2O (ml)	Mole Ratio TiO_2: Ag
P-0	3	0.0	100	
P-1	3	0.5	100	1:0.08
P-2	3	0.8	100	1:0.12
P-3	3	1.1	100	1:0.17
P-4	3	1.4	100	1:0.22

Table S2 The spinning parameters and casting solution compositions

Dope Composition	**Wt. (%)**
Kaolin	50
PESf	6.5
NMP	42.1
Aracel	1
Spinning parameters	
Air gap	10 cm
Extrusion rate	9.0 mL/min
Bore fluid rate	10.0 mL/min
Casting solution temperature	25ºC
External coagulation bath temperature	25ºC
N_2 pressure	21-30 psi

Table S3 Elemental composition of Ag in TiO_2 catalyst.

Sample	Ti (wt %)	O (wt %)	Ag (wt %)
P-0 (neat TiO_2)	65.2	39.5	0.0
P-1 (Ag@TiO_2, 0.5 g)	60.9	35.6	7.0
P-2 (Ag@TiO_2, 0.8 g)	58.9	32.7	8.1
P-3 (Ag@TiO_2, 1.1 g)	77.8	15.8	12.1
P-4 (Ag@TiO_2, 1.4 g)	60.4	22.2	17.3

Table S4 The grain size, surface area, and band gap of Ag@TiO_2 photocatalysts

Sample	Grain size (nm)	Dislocation density $(nm)^{-2}$	Surface area (m^2/g)	Band gap (eV)
P-0 (neat TiO_2)	28.81	0.0021	42.854	3.02
P-1 (0.5 g Ag@TiO_2)	42.12	0.0006	40.464	3.00
P-2 (0.8 g Ag@TiO_2)	46.72	0.0007	37.526	2.97
P-3 (1.1 g Ag@TiO_2)	49.45	0.0008	31.747	2.92
P-4 (1.4 g Ag@TiO_2)	50.22	0.0007	25.639	2.80

Table S5 Reduction in the TOC value (%) of BPA solution using Ag/TiO_2 photocatalysts.

Sample	Reduction in the TOC value (%)
P-1 (0.5 g Ag@TiO_2)	67
P-2 (0.8 g Ag@TiO_2)	52
P-3 (1.1 g Ag@TiO_2)	86
P-4 (1.4 g Ag@TiO_2)	78