Supplementary Information

Bentonite-titanium dioxide functional nanocomposite suitable for wastewater treatment; An integrated photocatalyst-adsorbent system

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FTIR spectra confirming the presence of titanium dioxide in the bentonite-titania nanocomposite is presented in Fig. S1.

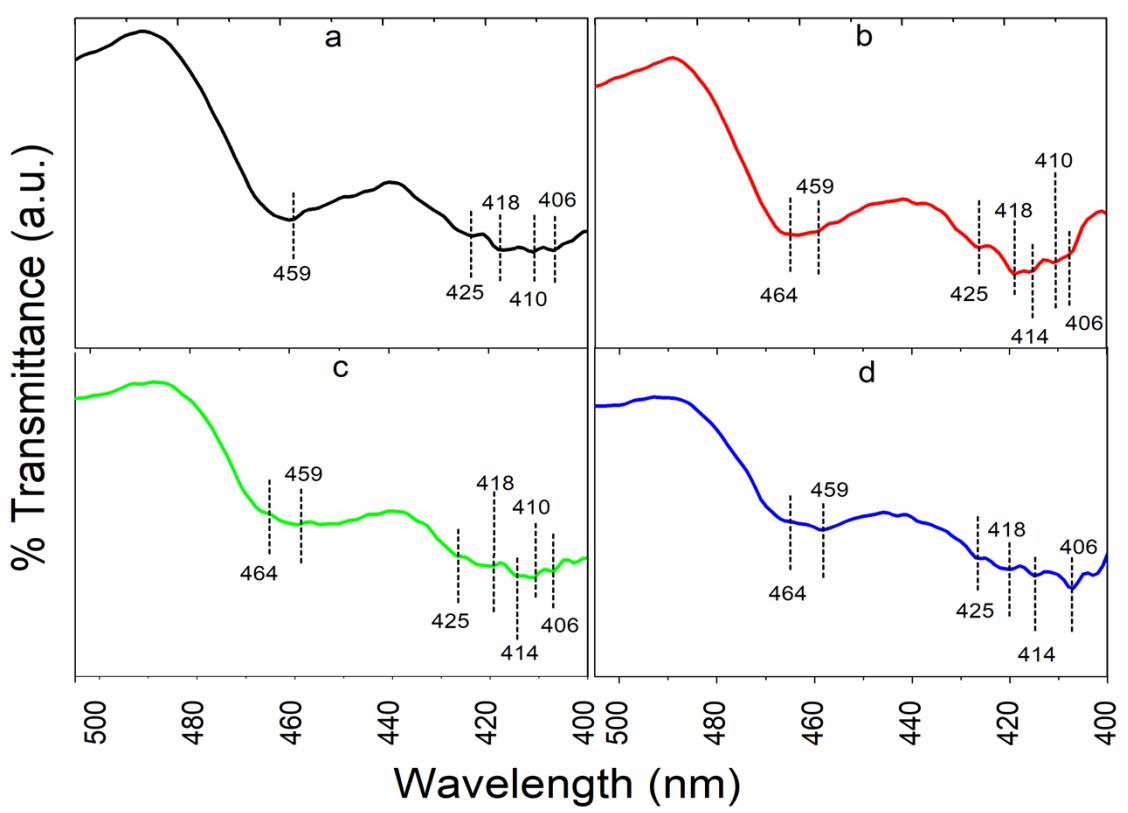

Fig. S1. FTIR spectra of (a) (a) pure bentonite (b) BT-0.25 (c) BT-0.5 and (d) BT-1, all calcined at 500 °C.

Table S1 presents the respective weight losses from thermogravimetric analysis at different temperature ranges for the prepared samples.

Table S1. Weight loss pattern from thermo-gravimetric analysis for pure bentonite, pure titania and for bentonite-titania nanocomposites.

Sample	Number of steps	Weight loss (%)	Weight loss (%)				
			Step1	Step 2	Step 3	Step 4	Step 5
Pure bentonite	four	15.1	50-100 °C	100-450 °C	450-525 °C	525-950 °C	Nil
			0.4	8.1	4.5	2.1	
BT-0.25	three	24.1	50-100 °C	100-525 °C	525-950 °C	Nil	Nil
			5.3	12.7	6.1		
BT-0.5	three	27.0	50-100 °C	100-525 °C	525-950 °C	Nil	Nil
			6.3	14.3	6.4		
BT-1	three	34.5	50-100 °C	100-525 °C	525-950 °C	Nil	Nil
			9.5	18.8	6.2		
BTc-0.5	three	15.1	50-100 °C	100-525 °C	525-950 °C	Nil	Nil
			1.3	8.0	5.8		
Pure titania	five	32.9	50-100 °C	100-225 °C	225-275 °C	275-425 °C	425-950 °C
			8.7	4.1	15.9	3.9	0.3

Heavy metal concentration of the industrial waste water sample collected from an electroplating industry as measured by an ICP-OES instrument is given below in Table S2.

Table S2. Heavy metal concentration in the industrial waste water sample.

Heavy metal	Concentration (ppm)
Fe	2691.1
Zn	933.4
Cr	88.7
Mn	29.6
Mg	51.9

Determination of CEC by Centrifuge Method

According to the reported procedure 5A2 of Soil Survey Laboratory Methods Manual Number42 [R1, R2], 5 g of bentonite sample was added to 33 ml of 1N sodium acetate and stirred for 5 minutes, followed by centrifugation. The supernatant solution was analyzed for K and Ca concentration using a Flame Photometer (Systronics, 128). This step was repeated

four times, so that exchange of all cations in bentonite for Na^+ is ensured. The sample was then washed with ethanol 3-4 times so that the electrical conductivity of the supernatant liquid reached between 55 to 40 μS/cm. The absorbed sodium in the sample was extracted using 1N ammonium acetate (three 30-mL portions) and the concentration of K, Ca and Na was determined by Flame photometry.

The CEC was calculated using the expression:

$$CEC = (A/W)*dilution*10$$

where: CEC is the cation exchange capacity in meq/ 100 g of clay

A = Na concentration (meq/L) and, W = sample weight (g)

CEC was calculated taking in account the sum of all the cations analyzed, ie K, Ca and Na, instead of just Na concentration.