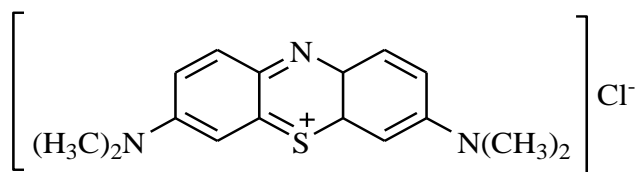
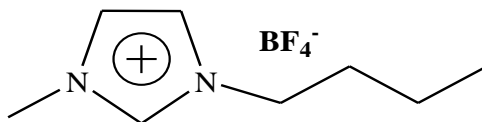


### Supporting Material

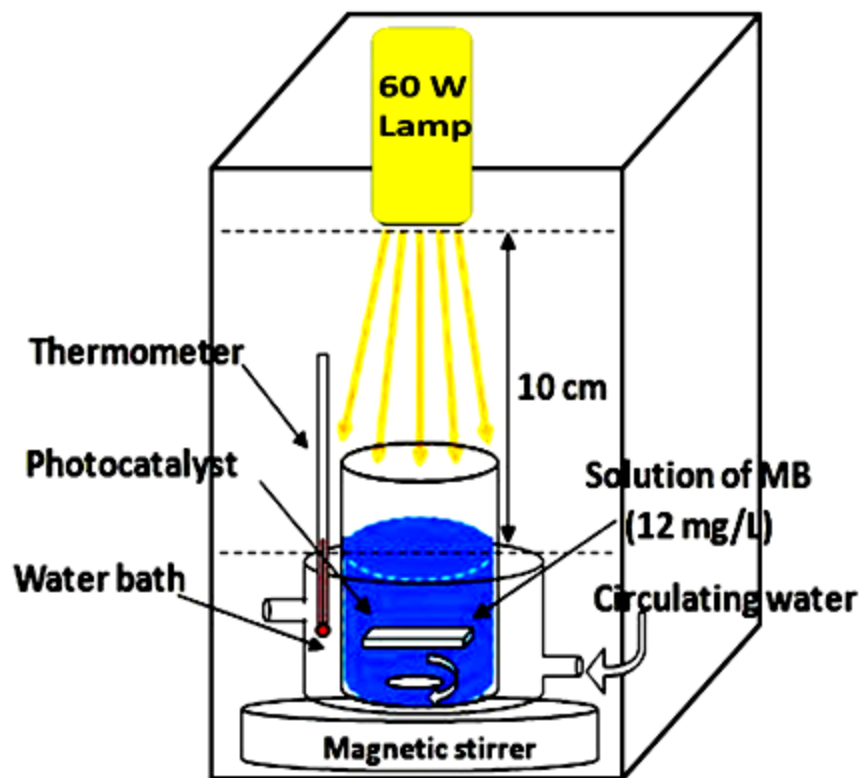


Methylene blue

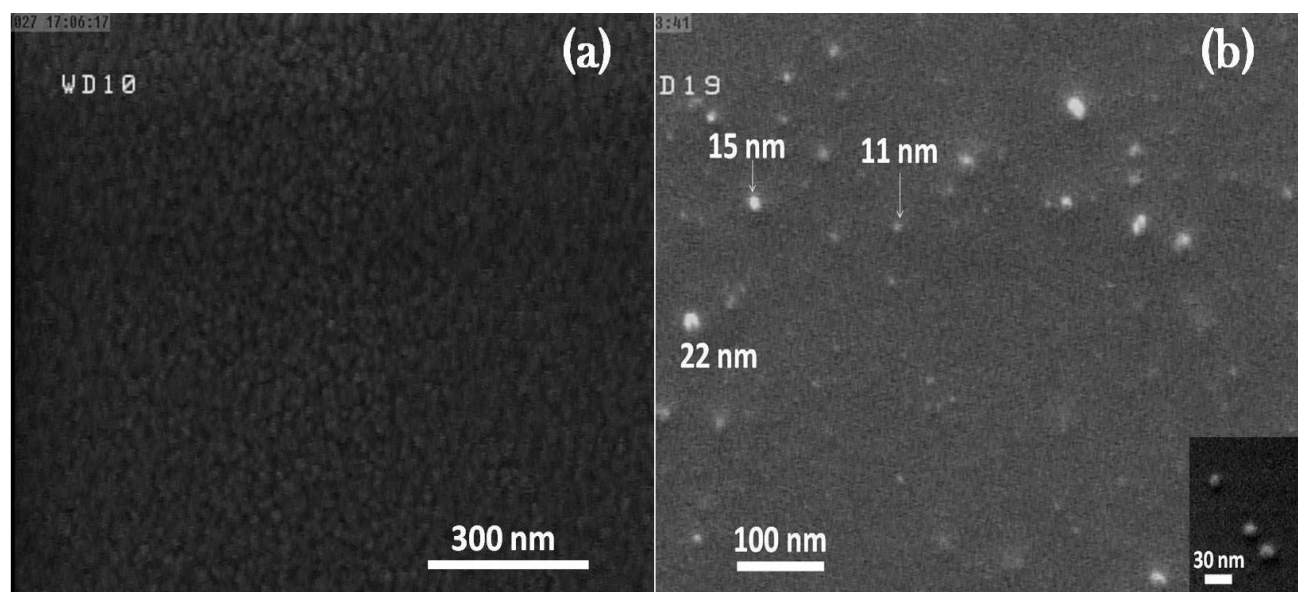
Schem. S1. Molecular structures of Methylene blue dye



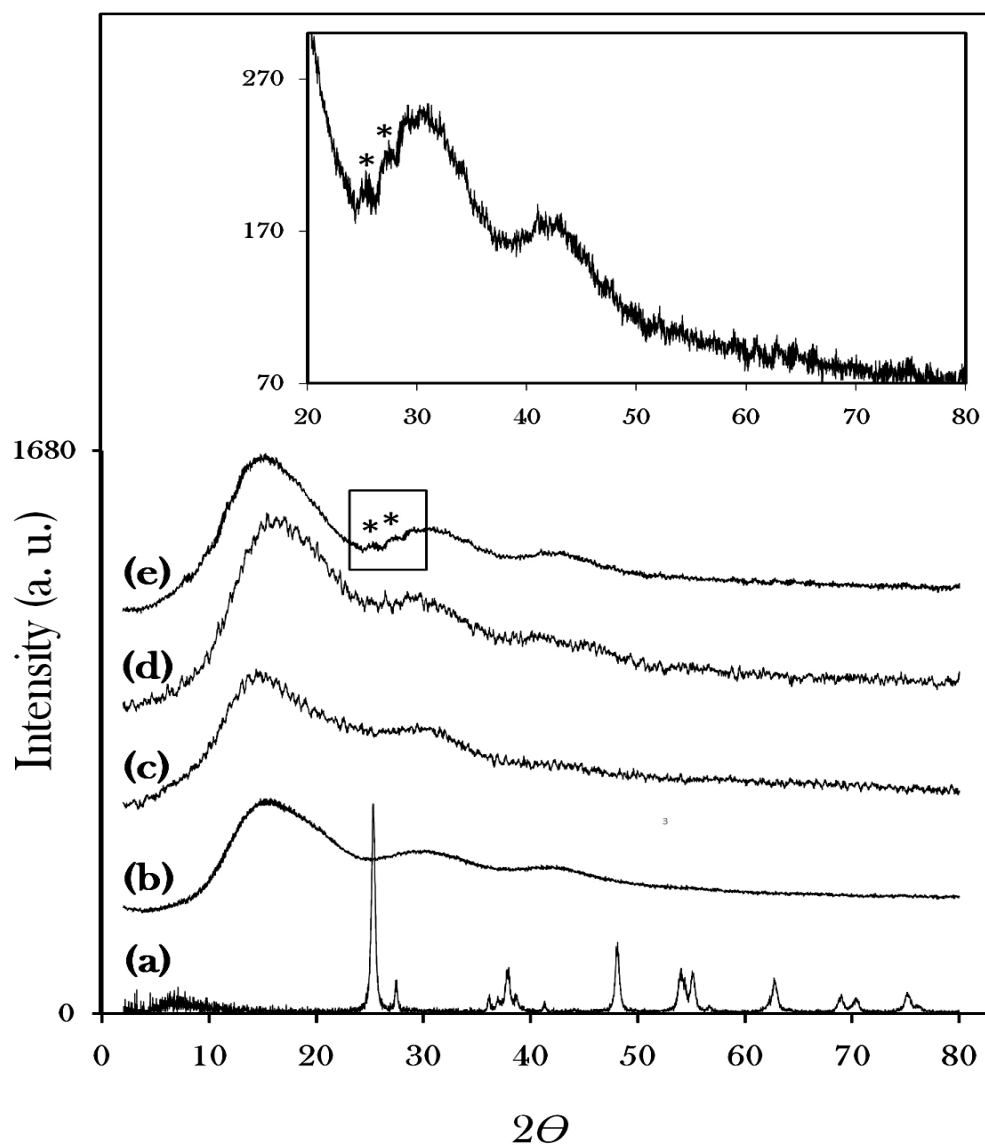
Schem. S2. Molecular structures of ([bmim][BF<sub>4</sub>]) Ionic Liquid



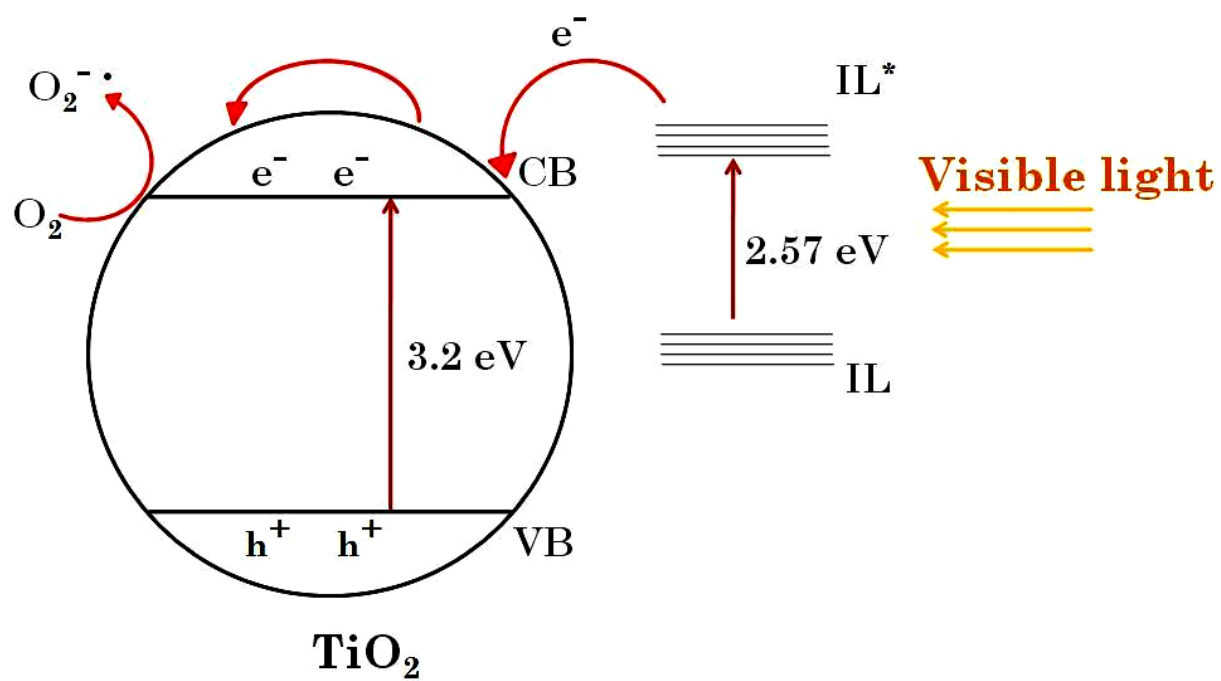
**Fig. S1.** Schematic of the experimental setup used for photocatalytic degradation of MB dye.



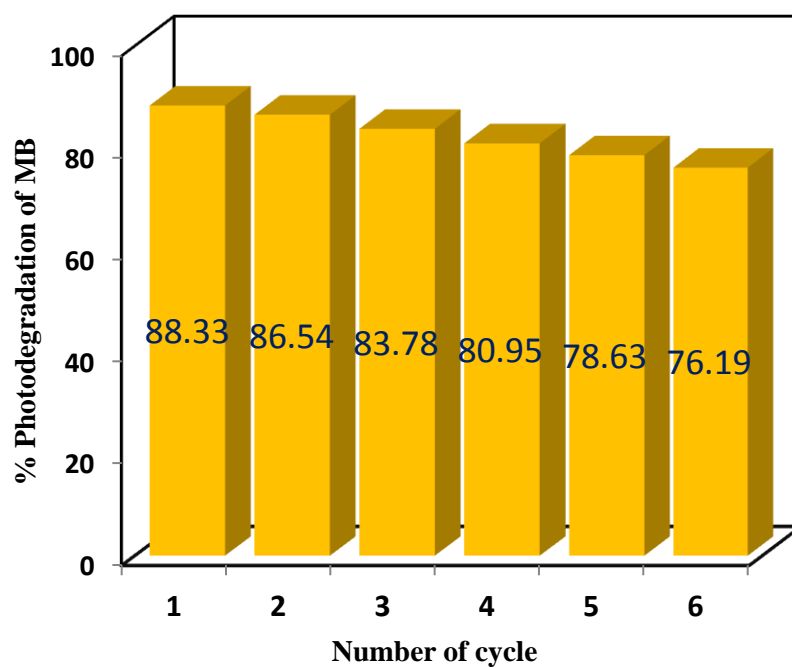
**Fig. S2.** FE-SEM images of (a) pure PMMA and (b) PMMA/TiO<sub>2</sub>/IL (S3).



**Fig. S3.** XRD patterns of (a) bare  $\text{TiO}_2$  powder, (b) pure PMMA, (c) 0.006 wt% PMMA/ $\text{TiO}_2$ /IL, (d) 0.01 wt% PMMA/ $\text{TiO}_2$ /IL (S3), (e) 0.012 wt% PMMA/ $\text{TiO}_2$ /IL.



**Fig. S4.** Postulated mechanism of the photoinduced charge transfer processes on  $\text{TiO}_2$  and IL molecule that collect visible light.



**Fig. S5.** Reusability of the photocatalyst for photocatalytic decolorization of MB dye solution under visible irradiation.