

Supplementary information

Tables and Figures

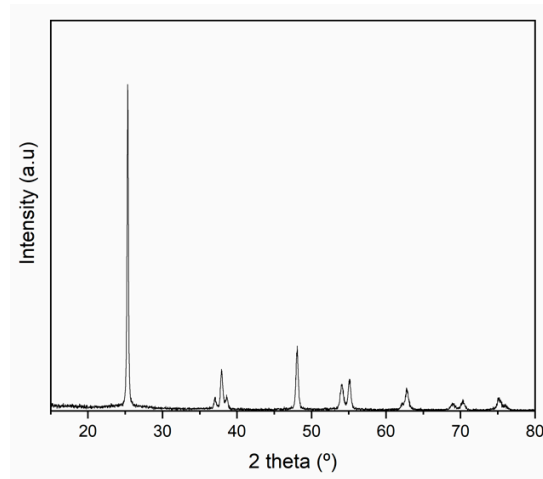


Figure S1. Powder X-ray diffraction pattern of synthesized TiO₂ NPs.

The diffuse reflectance spectrum is converted to the Kubelka Munk function $F(R)$, equivalent to the absorption coefficient. The Tauc model's α symbol is replaced with $F(R)$, and this is expressed according to the following equation:

$$(F(R) * h\nu) = A(h\nu - E_g)^n$$

In addition, for indirect transitions, phonon energy is involved in the network (E_Ω). once added to the model, the positive sign is related to the emission of a phonon and the negative to phonon absorption.

$$(F(R)h\nu) = A (h\nu - E_g \pm E_\Omega)^n$$

Drawing the Kubelka-Munk function $(F(R)h\nu)^n$ versus $h\nu$, where, for a direct transition with $n = 1/2$ and an indirect transition with $n = 2$ (**Figure S1**). Finally, the interval E_g can be obtained with a line tangent to the point of inflection of the curve of the graph $(F(R)h\nu)^n$ against $h\nu$, where $h\nu = 0$.

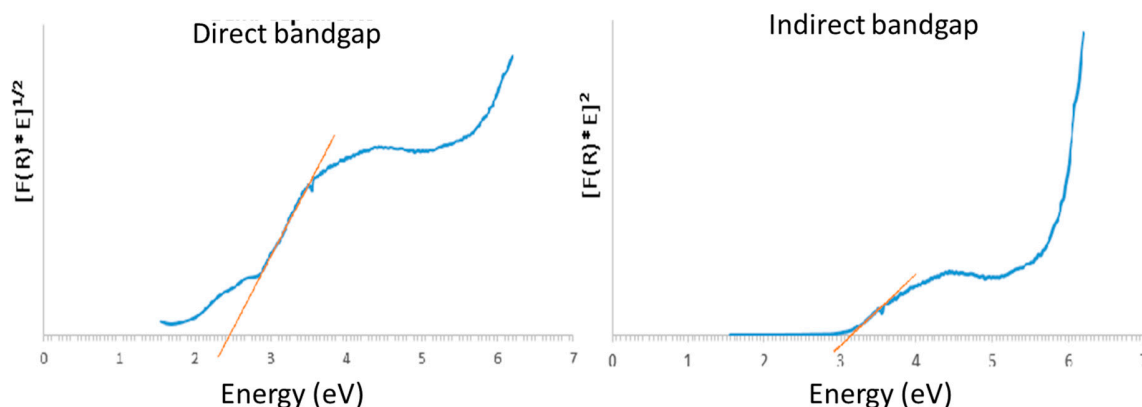


Figure S2. Graph for the determination of direct and indirect bandgap in the MIL-100 sample.

The TGA curve of Fe-BTC shows three process main between room temperature and 600 °C. The first one (approx 6.5%), in a range from 25 to 150 ° C is attributed to the desorption of the free water molecules inside the pores, and most likely, these water molecules interact with the iron trimers. The second one, the decomposition of organic ligand (Benzene-1,3,5-tricarboxylic acid) occurs in two steps in a range from 245 to 410 °C with weight loss of approx. 40 % . Finally, the last process above 500°C, Fe-BTC is transformed into amorphous Fe₂O₃ (Figure S3).

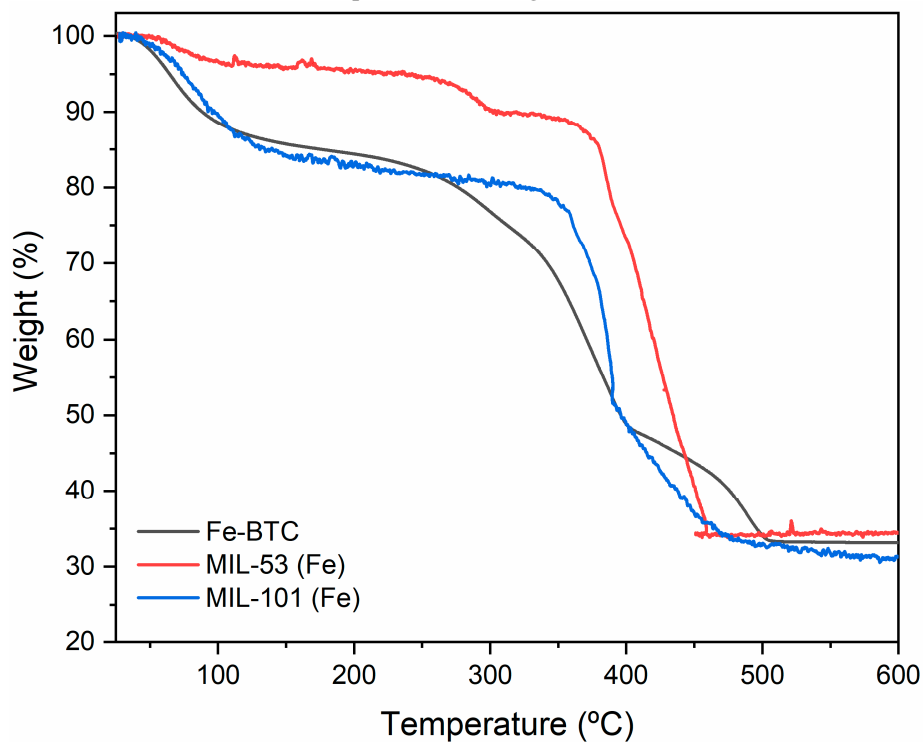


Figure S3. TGA of the MOFs pristine

Figure S3 shows the emission spectrum of the LEDs lamp used in the photocatalytic activity. As can be seen, two peaks emission are observed at 568 and 455 nm, which are within the region of the electromagnetic spectrum of visible light (350–750 nm).

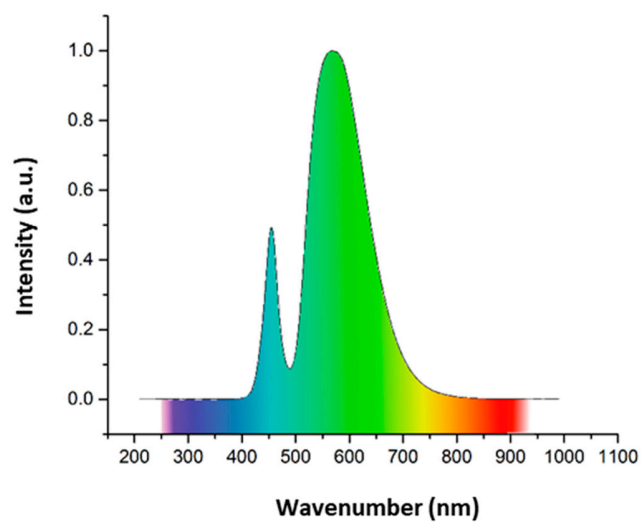


Figure S4. Emission spectrum of LEDs lamp used in the experiments.