Supplementary Materials

Low temperature synthesis of photoactive mesoporous TiO_2 nanomaterials

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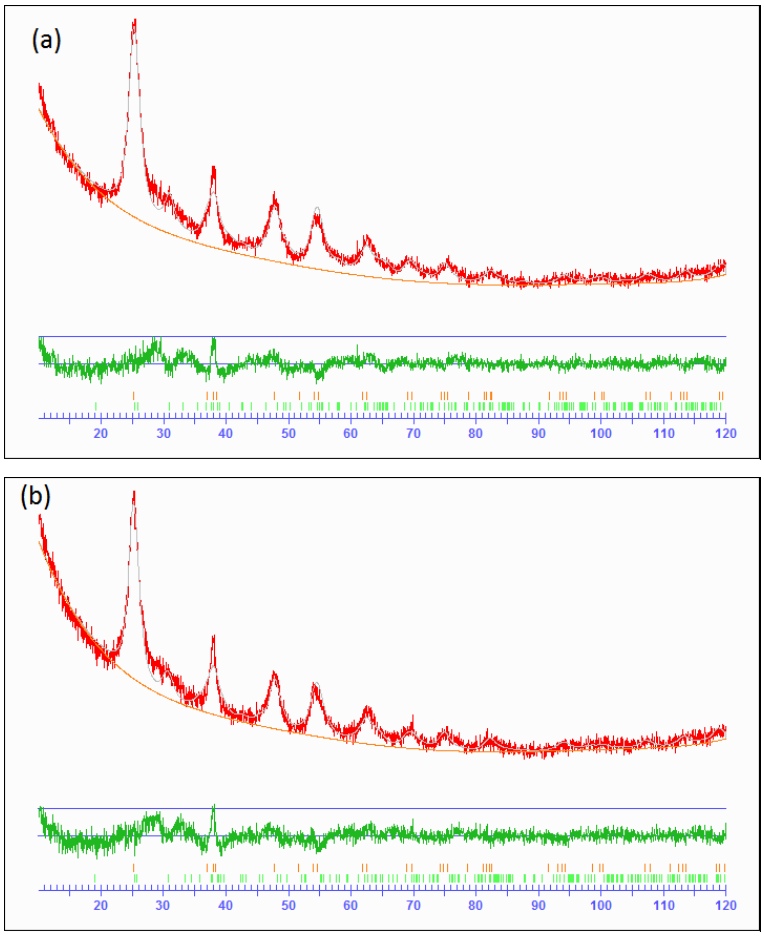

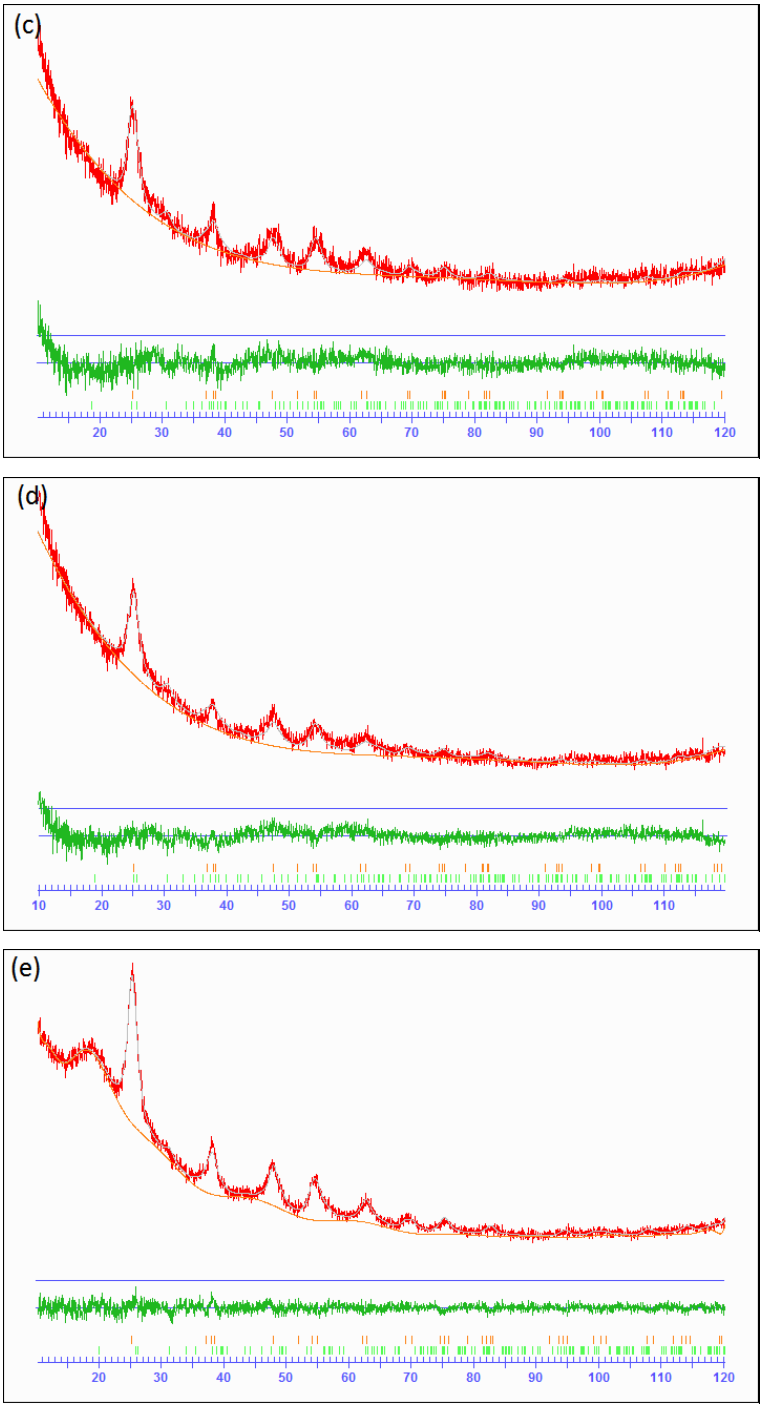

Figure S1: Quantitative phase analysis performed by Quanto [1] performed on the XRD patterns at (a)2h, (b)4h, (c)8h, (d)16h, (e)24h of thermal treatment. In each graph the red curve is the experimental one; the grey curve is the fitted profile; the orange curve is the interpoled background; the green curve is the difference profiles. Orange and green bars indicate anatase and brookite hkl reflection, respectively.

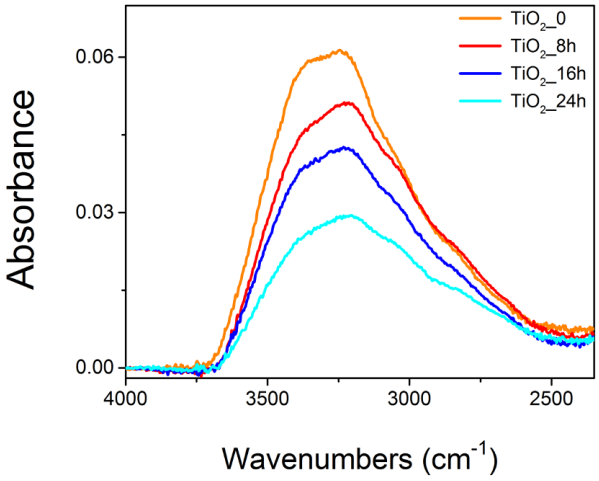

Figure S2: FTIR Spectra measured in ATR mode of TiO_2_0 (orange line); TiO_2_8h (red); TiO_2_16h (blue); TiO_2_24h (light blue) in the range 4000 – 2300 cm^{-1}.

The results of the comparison of the photoactivity of the prepared photocatalyst sample with that of TiO_2 P25, tested as a commercial benchmark are reported in Figure S3, pointing out that the decolouration extent for the reaction assisted by TiO_2 P25 (83 ± 5 %) is slightly higher than that obtained when TiO_2_16h sample is used (72 ± 4 %). However a decisive assessment could not be safely performed, considering the different characteristics of the investigated photocatalyst with respect to the commercially available counterpart. In fact, the difference in terms of granulometry between the commercial TiO_2 P25 and the prepared TiO_2 make inconsistent the comparison between their photocatalytic activity. Such different features result in a different dispersibility of the two photocatalysts in the MB solution, much higher for the TiO_2 P25 than for the proposed photocatalyst (Figure S4). Moreover, the different amount of MB adsorbed at the surface of the photocatalyst, measured by the experiment carried out in the dark, is also critical. Indeed, TiO_2 P25 showed an absorption value (6 ± 1 %) much lower than that found for the synthesized photocatalyst, therefore, it is not straightforward to carry out a reliable comparison of the photocatalytic efficiency between the prepared photocatalyst and the commercial one.

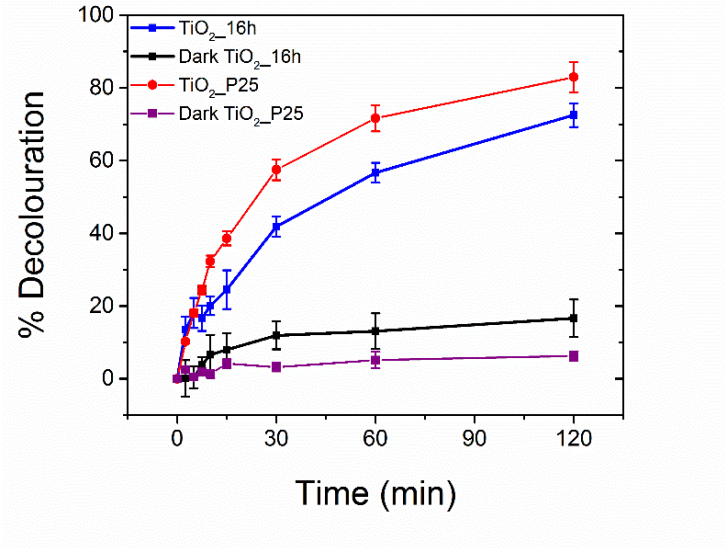

Figure S3: Time course evolution of Methylene Blue (MB) decolouration at pH 6, under UV assisted by TiO_2_16h (blue line), TiO_2_P25 (red line). Control experiments in dark condition are reported for TiO_2_16h (black line) for TiO_2 P25 (violet line). Experimental data are presented as mean values ± standard deviation obtained from the analysis of five replicates.

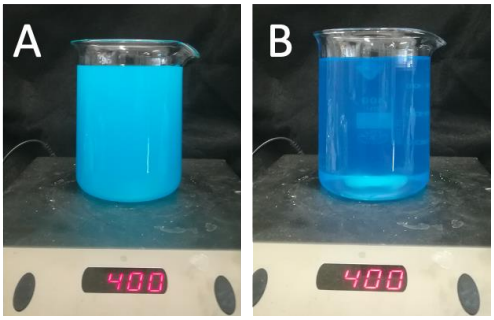

Figure S4: Pictures of MB solution 10^{-5} M containing photocatalyst TiO_2 P25 (panel A) and TiO_2_16h (panel B)

References

[1] A. Altomare, M. C. Burla, C. Giacovazzo, A. Guagliardi, A. G. G. Moliterni, G. Polidori, R. Rizzi, *J. Appl. Crystallogr.* **2001**, *34*, 392-397.