

SUPPORTING INFORMATION

Influence of Adsorbed Water on the Activation Energy of Model

Photocatalytic Reactions

F. Parrino*¹, P. Conte², C. De Pasquale², V. A. Laudicina², V. Loddo¹, L. Palmisano¹

¹Dipartimento di Ingegneria Elettrica, Dipartimento di Energia, Ingegneria dell'Informazione, e Modelli Matematici (DEIM), v.le delle Scienze, Edificio 6, 90128 – Palermo, Italy.

E-mails: francesco.parrino@unipa.it; vittorio.loddo@unipa.it; leonardo.palmisano@unipa.it.

²Dipartimento di Scienze Agrarie e Forestali, Università degli Studi di Palermo, v.le delle Scienze, Edificio 4, 90128 – Palermo, Italy.

E-mails: pellegrino.conte@unipa.it; claudio.depasquale@unipa.it; vitoarmando.laudicina@unipa.it.

*Corresponding author: francesco.parrino@unipa.it, tel. 0039 091 238 63748.

X-ray diffraction patterns of the TiO₂ samples are shown in Figure S1. Commercial samples show higher crystallinity when compared with the home prepared ones as evidenced by their sharper peaks. The thermal treatment at 773 K for 4 h confers to the HP05C sample higher crystallinity with respect to the HP05 one (60% against 8%).

Merck and Sigma-Aldrich commercial samples consist of pure anatase phase (characteristic patterns, according to JCPDS 21-1272, indicated with circles in Figure S1) and rutile phase (characteristic patterns, according to JCPDS 21-1276, indicated with asterisks in Figure S1), respectively.^{1,2} Home prepared samples are mixtures of anatase and rutile.

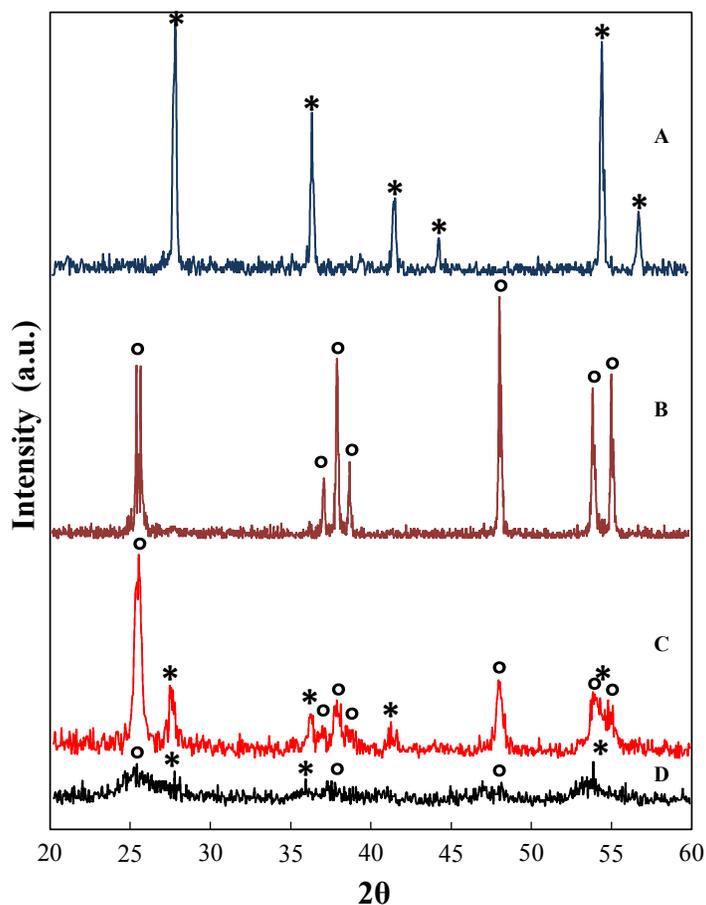


Figure S1. XRD patterns of Sigma-Aldrich (A), Merck (B), HP05C (C) and HP05 (D) samples. Asterisks and circles indicate the patterns of rutile and anatase phase, respectively.

The behavior of Merck and Sigma-Aldrich samples could not be satisfactorily described through the Arrhenius model as indicated by the low values of the coefficient of determination R^2 (0.23015 and -0.28227, respectively) reported in the insets of Figure S2. This is probably due to the low SSA of the samples. The τ values, reported in Figure S2, were constant for Sigma-Aldrich and increased with temperature in the case of Merck sample.

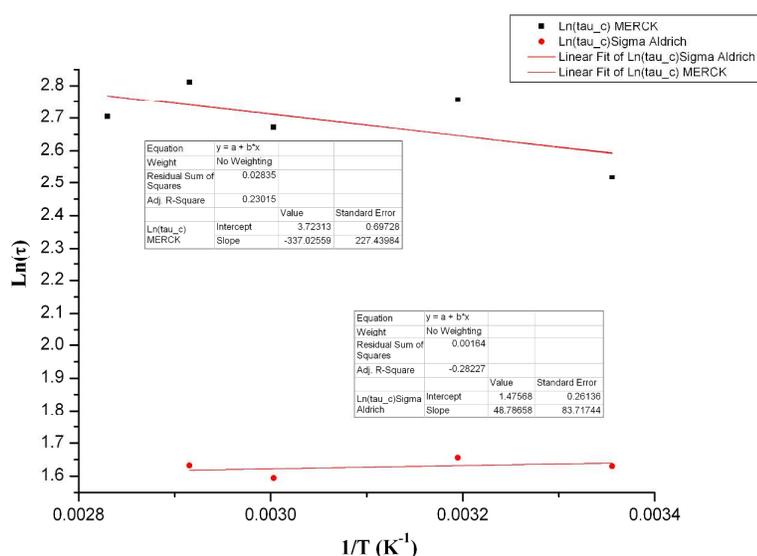


Figure S2. Arrhenius graphs reporting the temperature variation of the correlation time (τ) for Merck (black squares) and Sigma Aldrich (red circles) samples.

References

- (1) Di Paola, A.; Bellardita, M.; Megna, B.; Parrino, F.; Palmisano, L. Photocatalytic Oxidation of Trans-Ferulic Acid to Vanillin on TiO_2 and WO_3 -loaded TiO_2 Catalysts. *Catal. Today* **2015**, *252*, 195-200.

(2) Yurdakal, S.; Palmisano, G.; Loddo, V.; Alagöz, O.; Augugliaro, V.; Palmisano, L. Selective Photocatalytic Oxidation of 4-Substituted Aromatic Alcohols in Water with Rutile TiO₂ Prepared at Room Temperature. *Green Chem.* **2009**, *11*, 510-516.