SUPPORTING INFORMATION

Alkaline treatment as a means to boost activity of TiO_2 in selective photocatalytic processes

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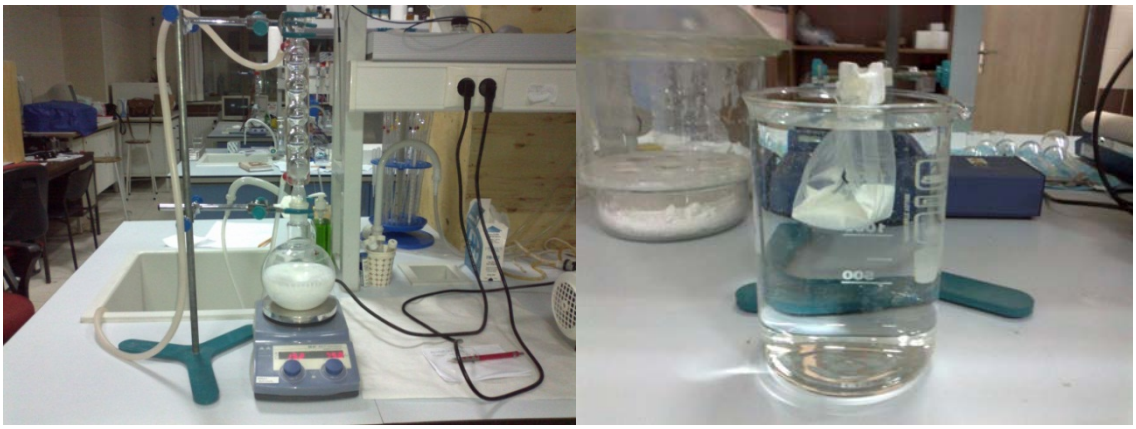
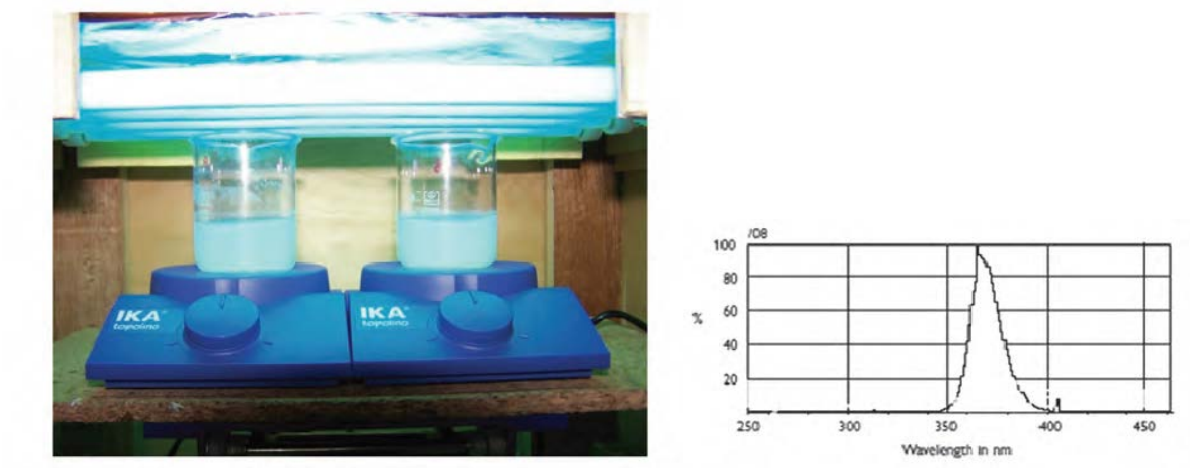


(a) **(b)**

Fig. S1 Digital images of the used setup for catalyst refluxing (a) and dialysis (b).



(a) **(b)**

Fig. S2 Digital image of the used photocatalytic UV system and the emission spectrum of used lamps.

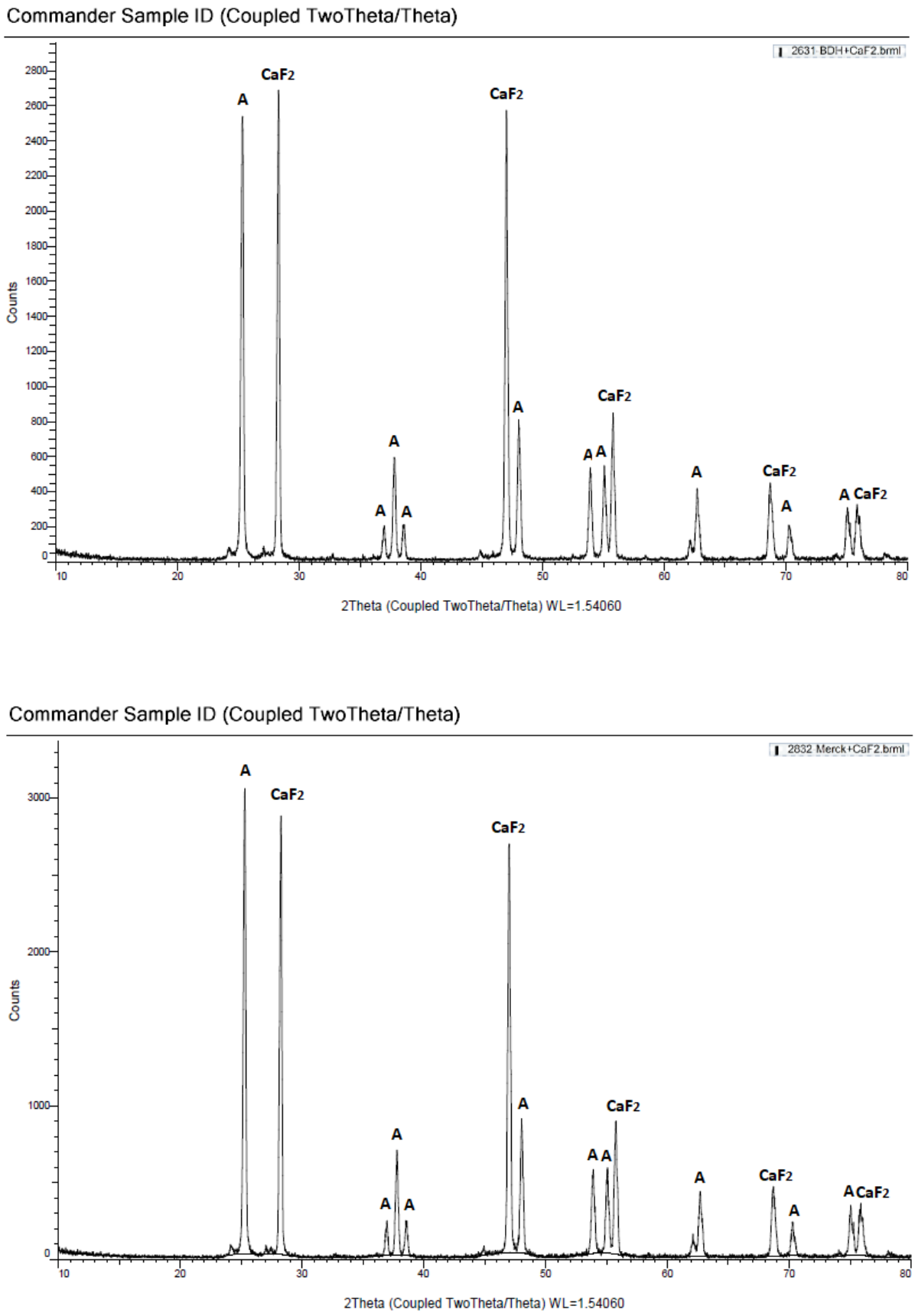
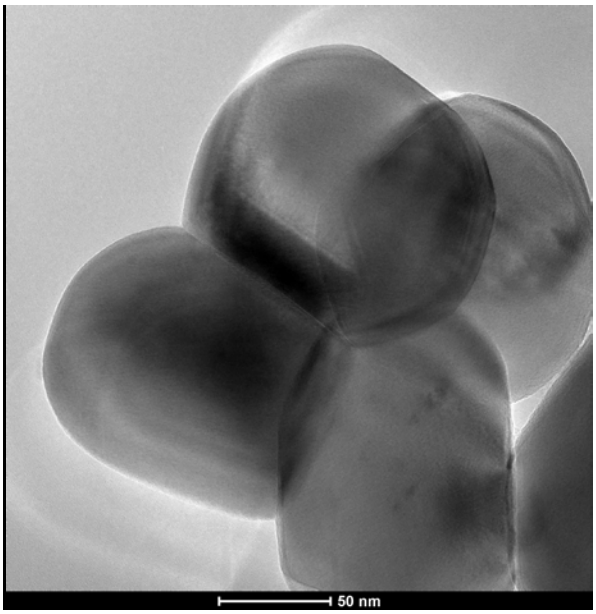
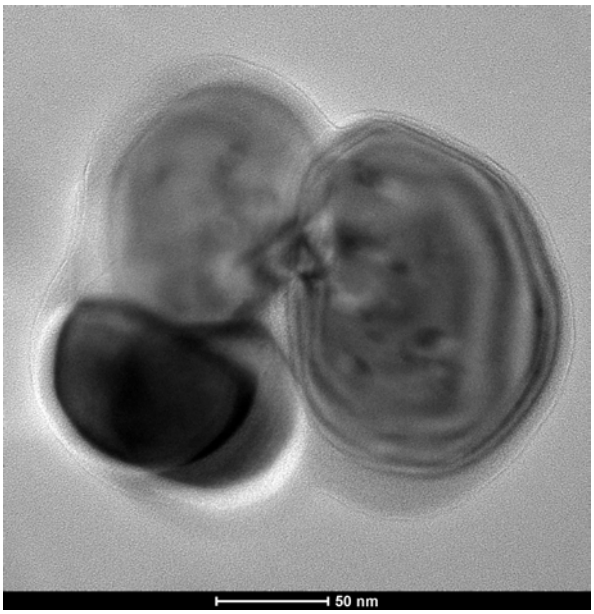


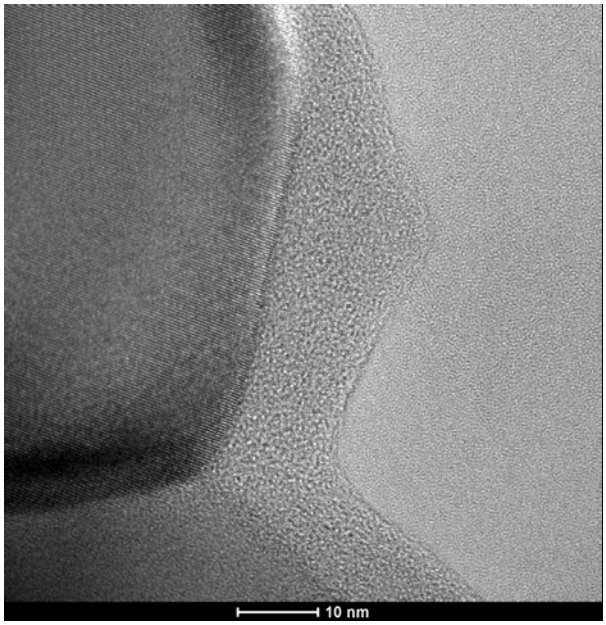
Fig. S3 XRD diffractograms of a mechanical mixture of TiO_2 (BDH (up) or Merck (down) and CaF_2 (50%, w/w), recorded for the estimation of crystallinity. A: Anatase.



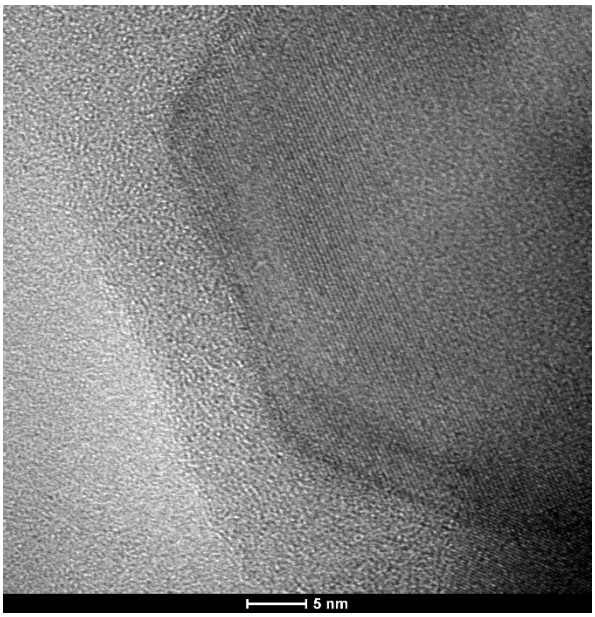
BDH-1M-24h-25



BDH-1M-24h-100



BDH-1M-24h-100



BDH-12M-24h-25

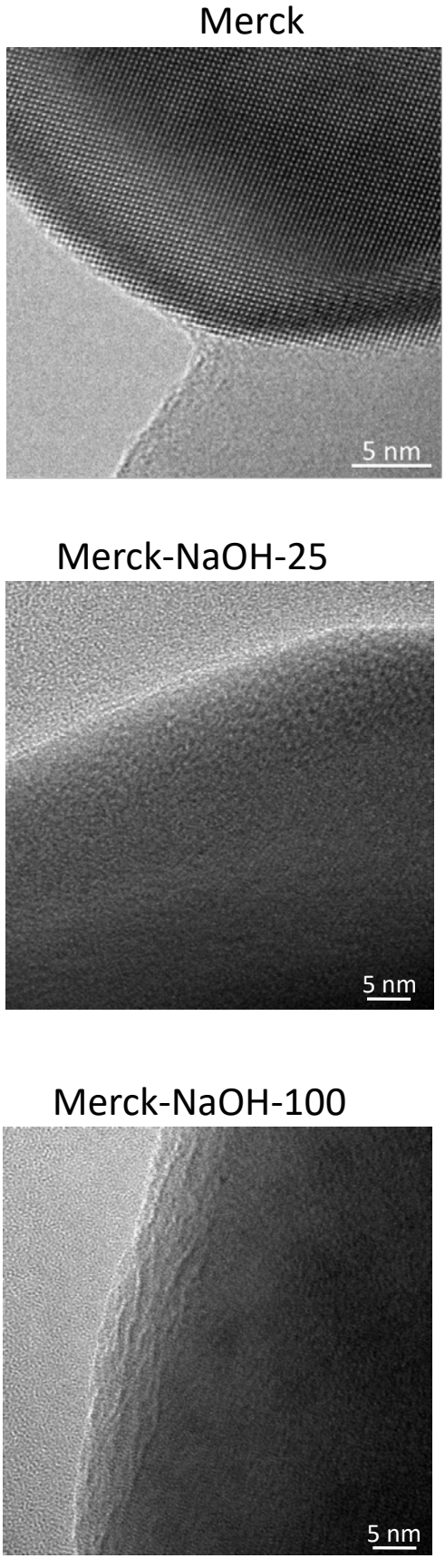


Fig. S4 TEM micrographs of modified BDH and Merck TiO_2 samples.

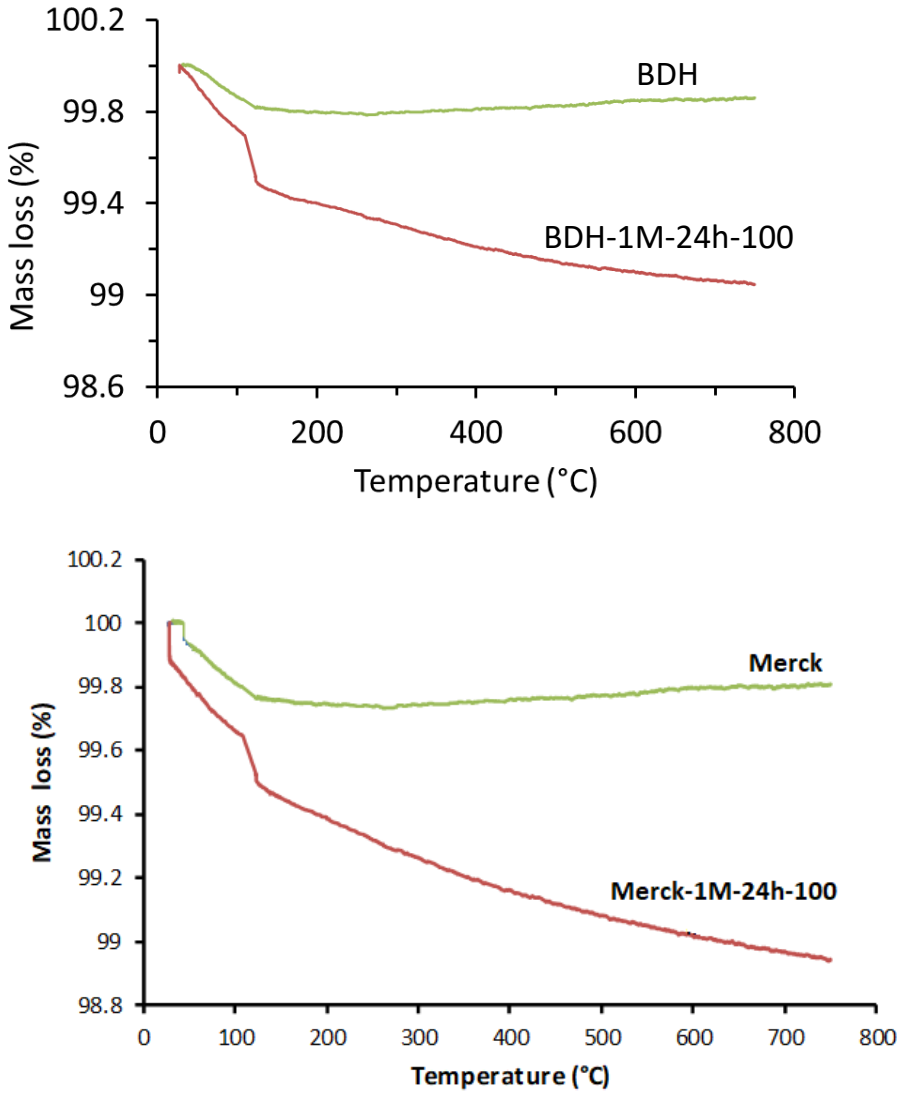
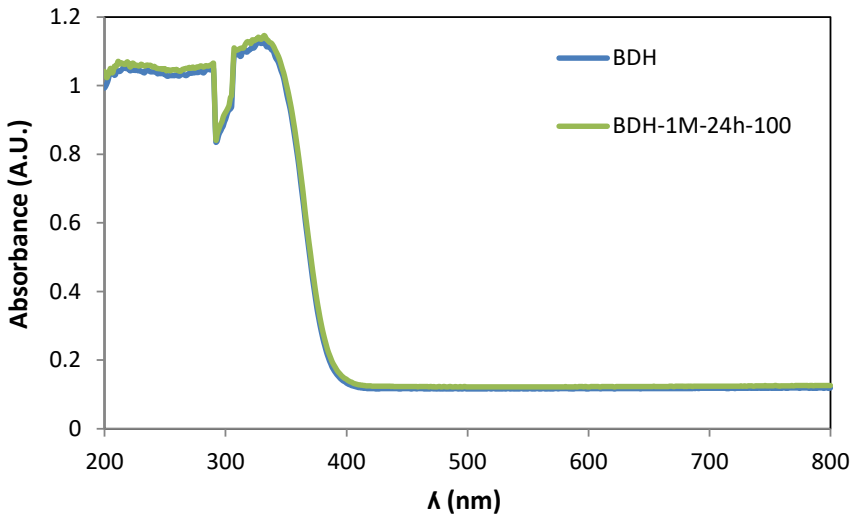


Fig. S5 TGA analysis of a pristine and a select alkaline-treated BDH and Merck TiO_2 catalyst.



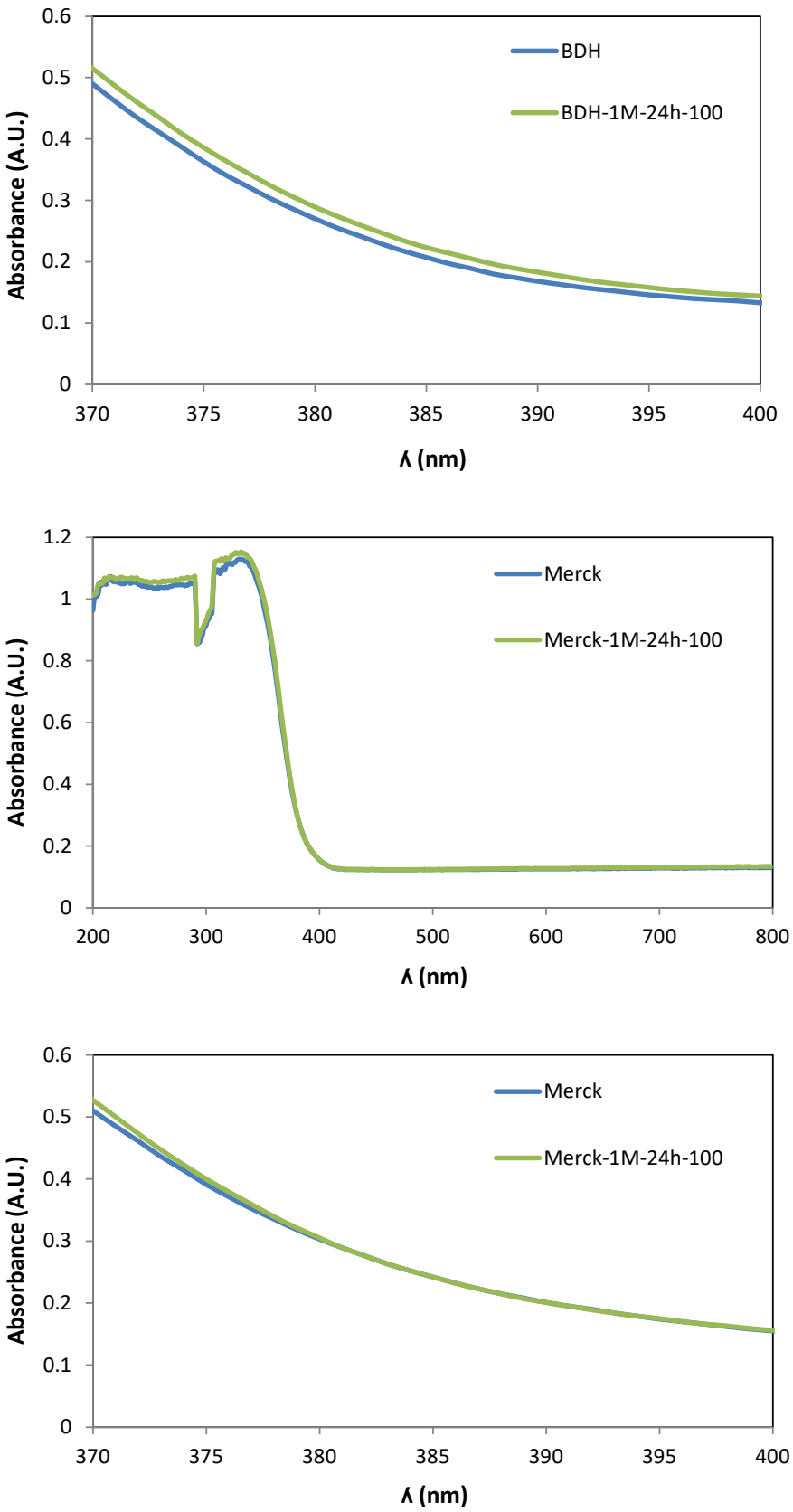


Fig. S6 UV-Vis diffuse reflectance spectra reported in absorption of BDH, BDH-1M-24h-100, Merck and Merck-1M-24h-100 samples in different visualization.

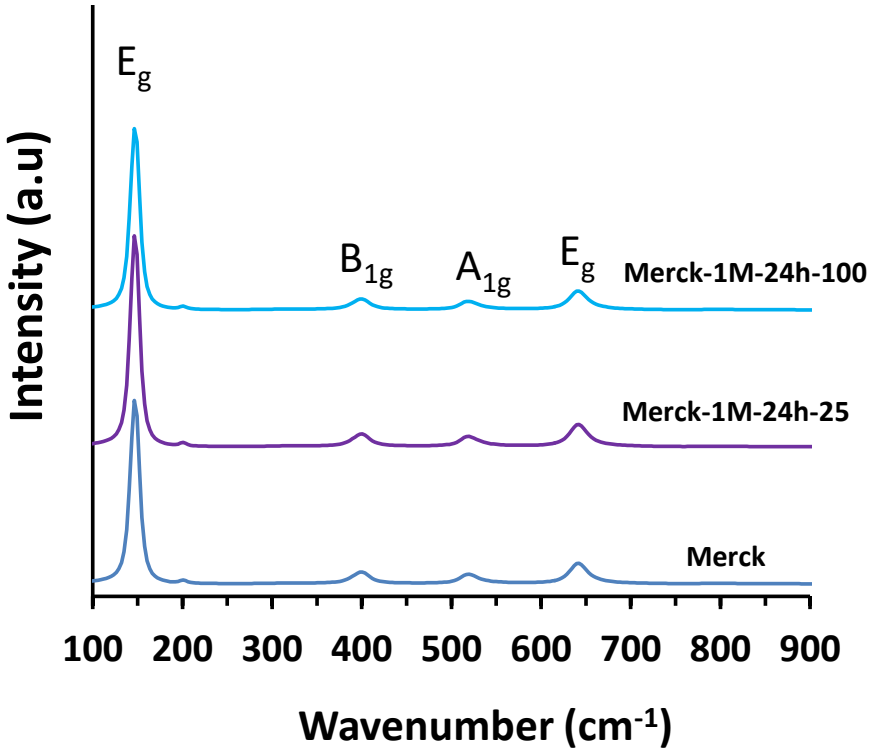
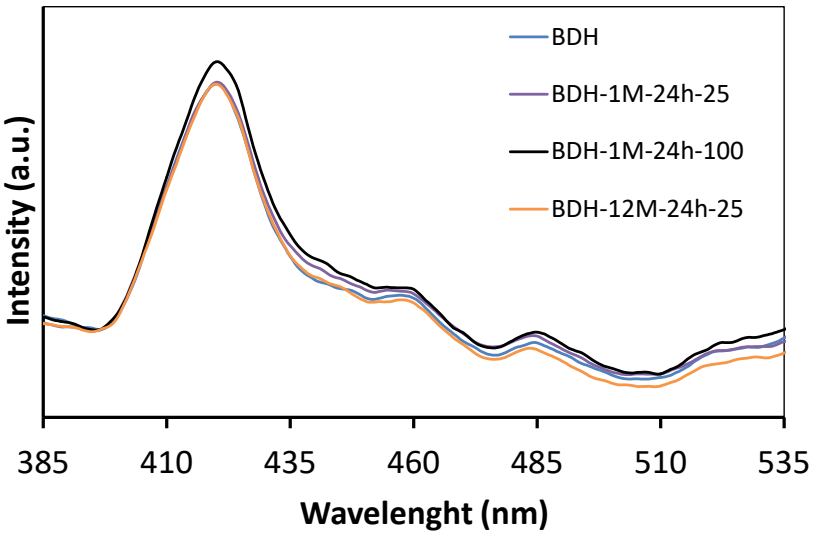


Fig. S7 Raman spectra of pristine and selected Merck TiO_2 catalysts.



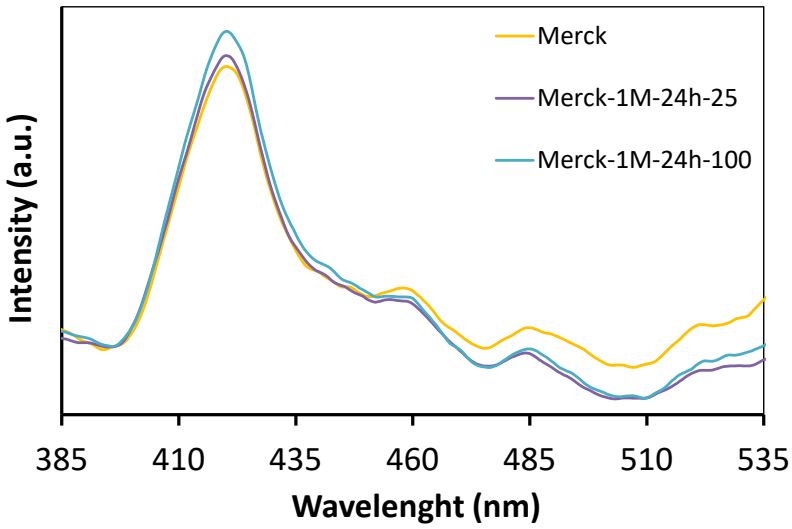


Fig. S8 Photoluminescence emission spectra of NaOH treated BDH (up) and Merck (down) samples.

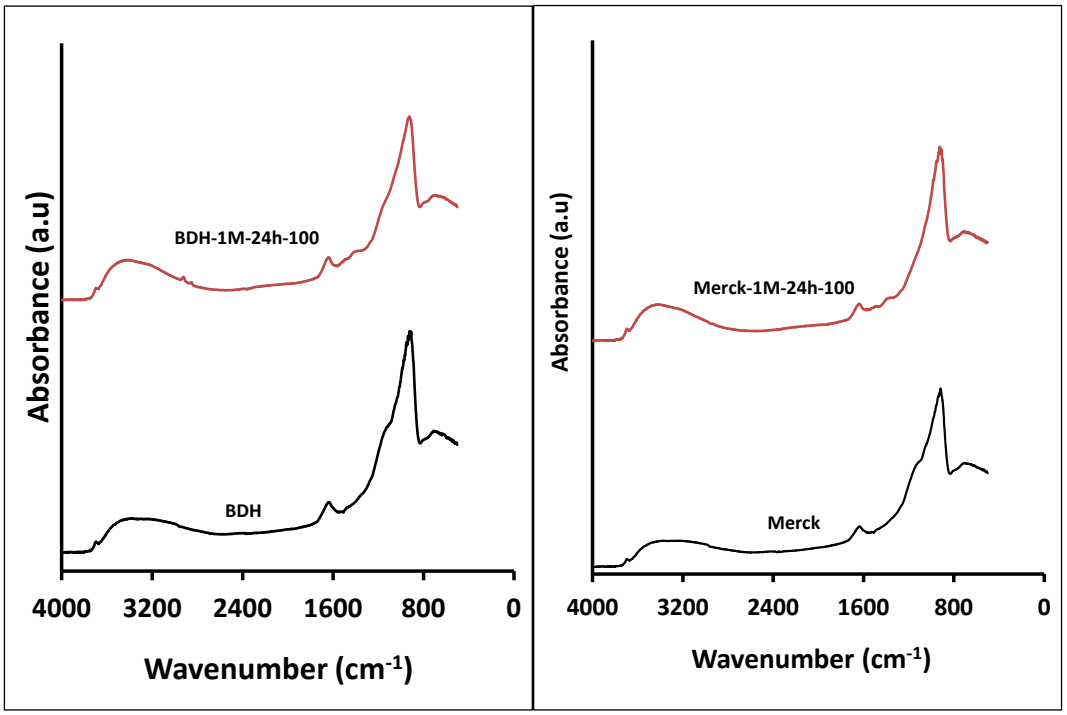


Fig. S9 DRIFT spectra of selected BDH and Merck in the range of 4000-500 cm^{-1}.

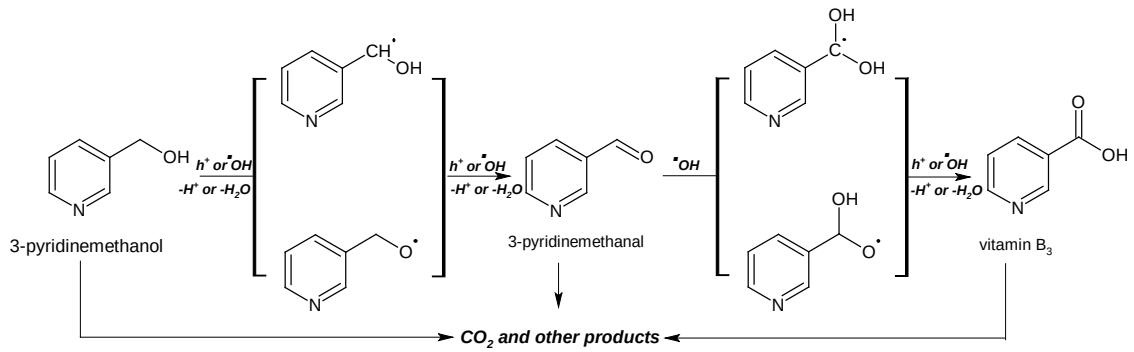
$TiO_2 + h\upsilon \rightarrow e^- + h^+$ (S1)

$O_2 + e^- \rightarrow {}^{\bullet}O_2^-$ (S2)

${}^{\bullet}O_2^- + H^+ \rightarrow HO_2^{\bullet}$ (S3)

$2HO_2^{\bullet} \rightarrow O_2 + H_2O_2$ (S4)

$H_2O + h^+ \rightarrow H^+ + {}^{\bullet}OH$ (S5)



Scheme S1. The proposed mechanism for photocatalytic oxidation of 3-pyridinemethanol to 3-pyridinemethanal and vitamin B_3.[1,2]

References

1. S. Yurdakal, Ş. Ö. Yanar, S. Çetinkaya, O. Alagöz, P. Yalçın and L. Özcan, *Appl. Catal. B,* 2017, **202**, 500-508.

2. S. Yurdakal, S. Çetinkaya, M.B. Şarlak, L. Özcan, V. Loddo, L. Palmisano, *Catal. Sci. Technol*., 2020, **10**, 124-137.