Electronic Supplementary Information

Nano-titania doped with europium and neodymium showing simultaneous photoluminescent and photocatalytic behaviours

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Figure & Captions

Fig. S1 – Emission spectra for a) UV lamp used for photocatalytic tests in liquid-solid phase; b) solar lamp (Osram Ultra-Vitalux, 300 W) and c) Philips LED Bulb Warm white; the latter two lamps were used for the photocatalytic tests in gas-solid phase. Sources: a) and c): www.philips.com; b) Sammartino et al., Chemistry Central Journal, 7, 181-191, 2013.

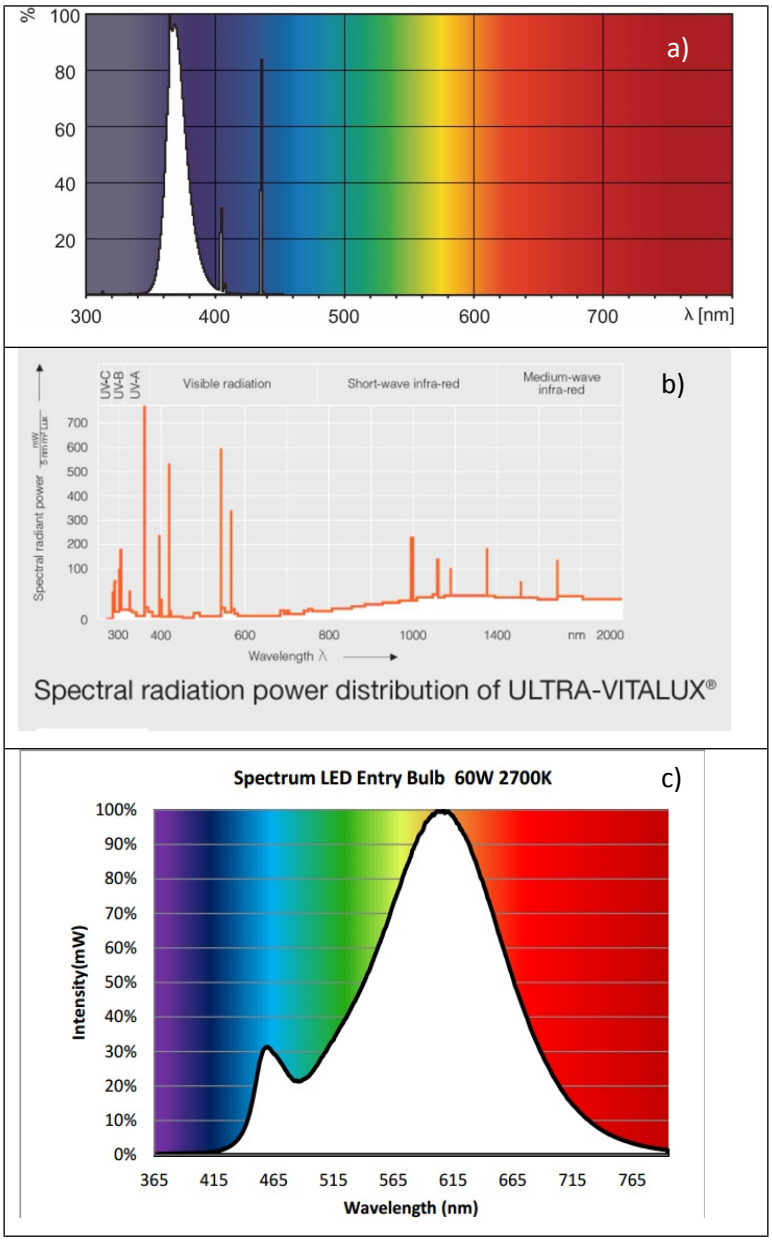

Fig. S2 – Graphic output of the Rietveld refinement of sample **1%Nd_N_dp**, thermally treated at 450 °C. The red line represents the calculated pattern, the black open squares the observed pattern, and the difference curve between observed and calculated profiles is plotted below. The position of reflections is indicated by the small vertical bars (red, anatase; green, rutile; black, brookite).

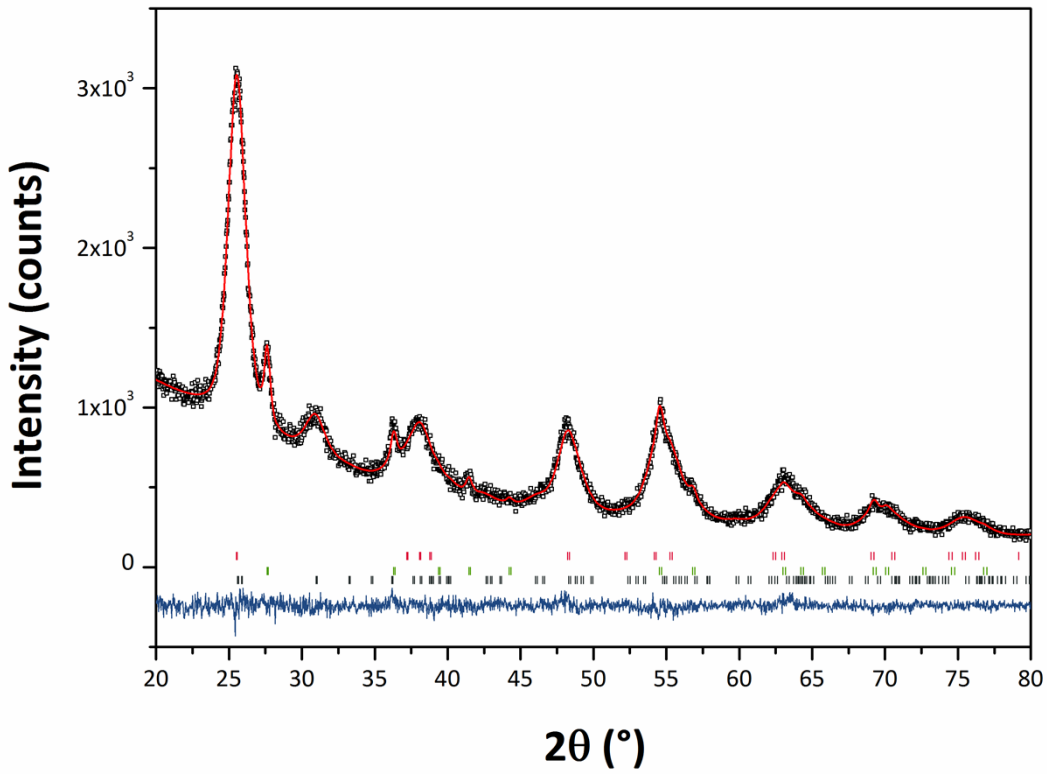

Fig. S3 – Graphic output of the WPPM modelling (sample **1%Eu_N_dp**). The black open squares represent the observed data, the red continuous line the calculated data. The blue continuous line in the bottom show the difference curve between observed and calculated profile.

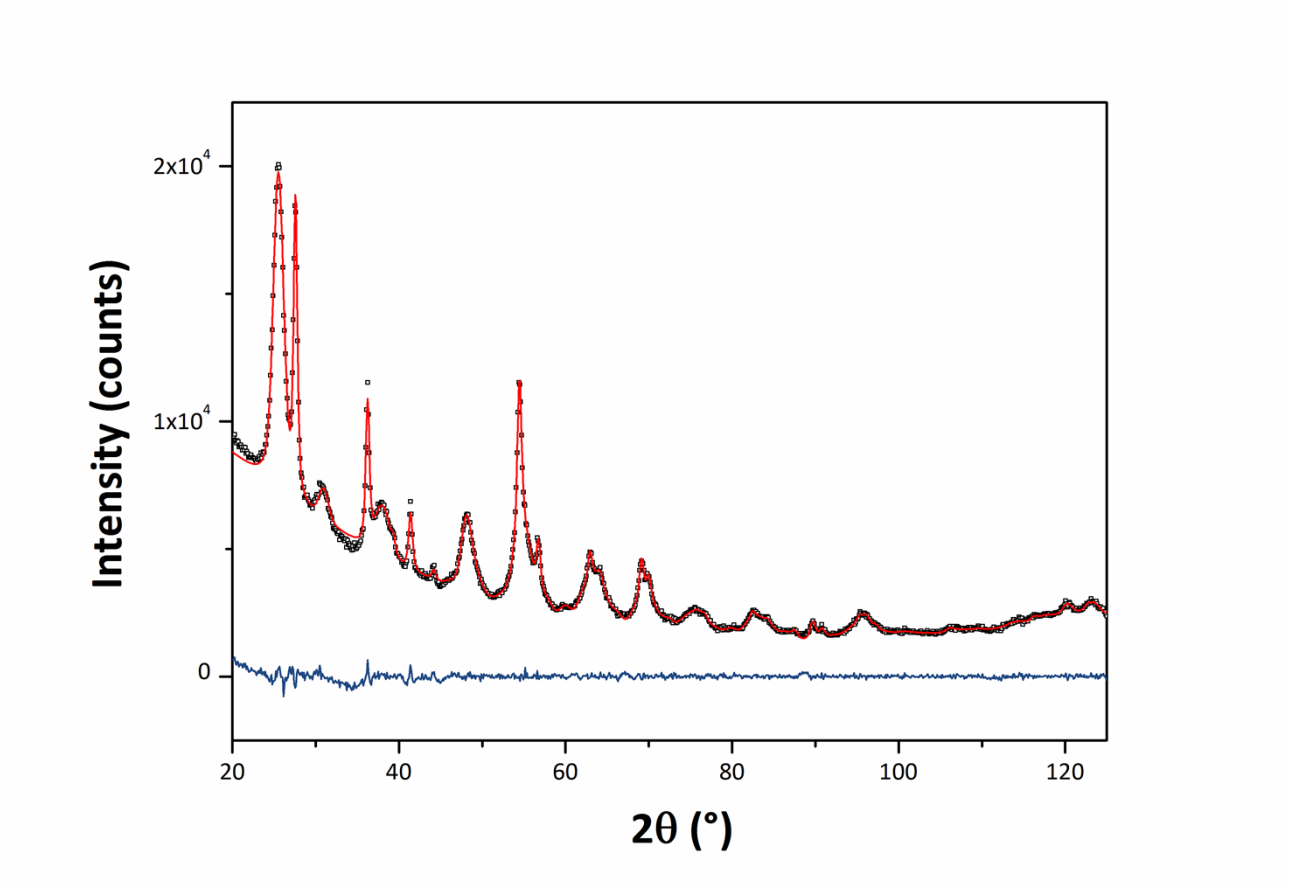

Fig. S4 – Size distribution, as obtained from the WPPM modelling, of samples **TiO_2**, **5%Eu_N_co**, and **5%Nd_C_dp**. a) Anatase; b) rutile; c) brookite.

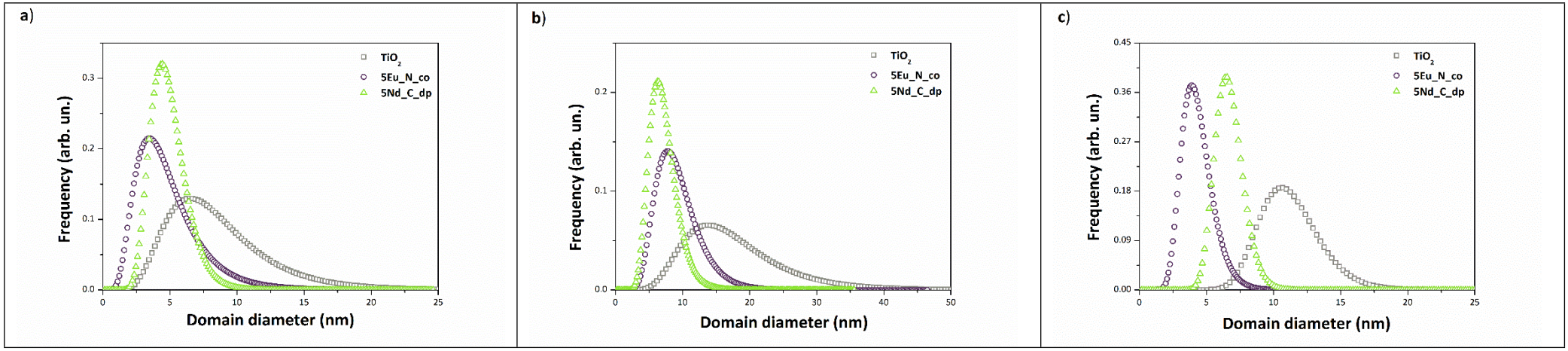

Fig. S5 – Plot of diffuse reflectance first derivative *versus* wavelength λ of sample **5%Eu_N_dp**. The green curve is the result of the fitting, while the dashed vertical line represents the optical band gap (E_g), assigned to anatase (red dashed line), brookite (black dashed line), and rutile (blue dashed line) in that sample.

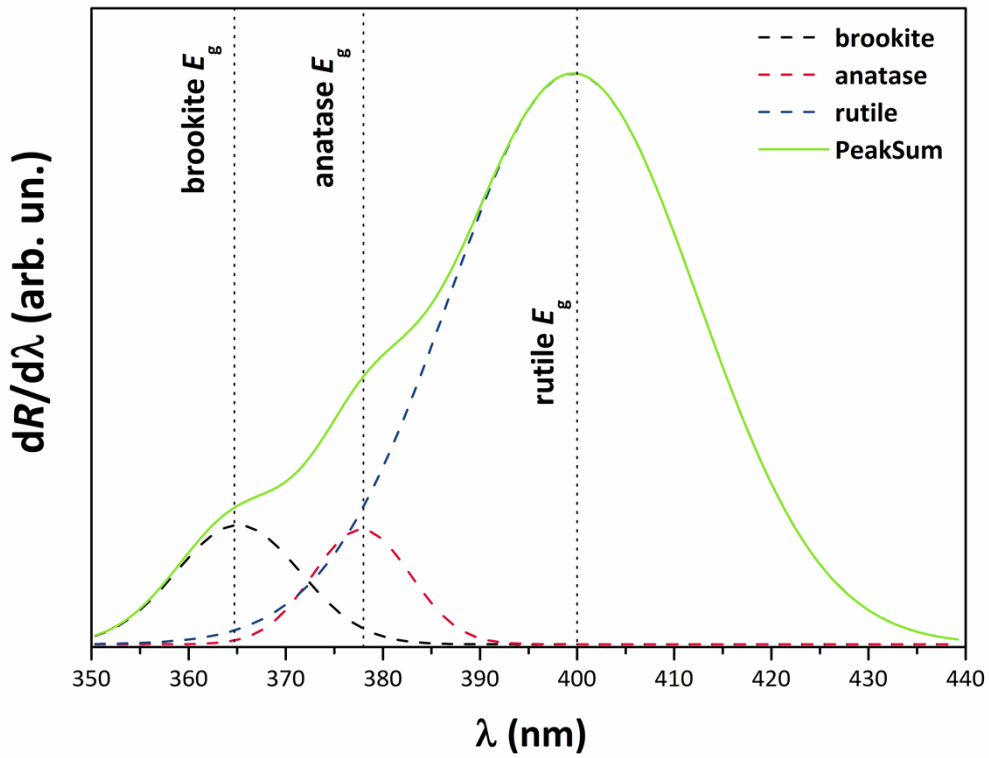

Fig S6 – Emission spectra of (a) **1%Eu_C_dp**, and (b) **1%Eu_C_co**, excited at 414 and 532 nm.

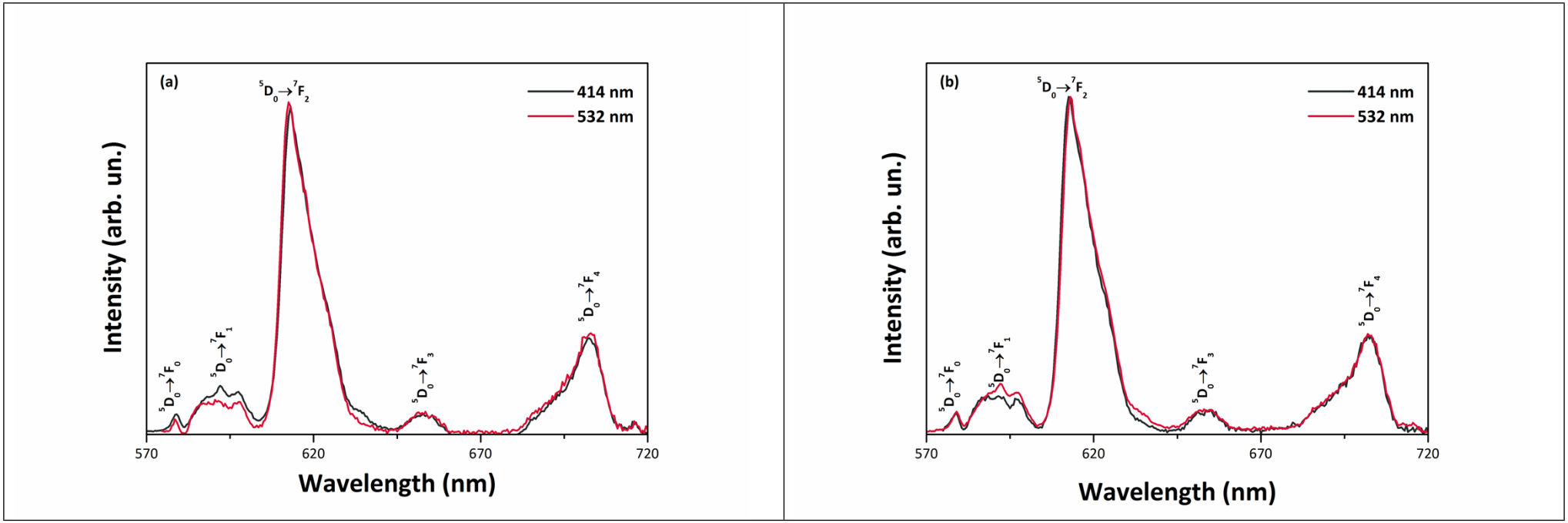

Fig. S7 – Photocatalytic activity result in liquid-solid phase, considered as the pseudo-first order kinetic constants k'_{app}, using UV-light irradiation.

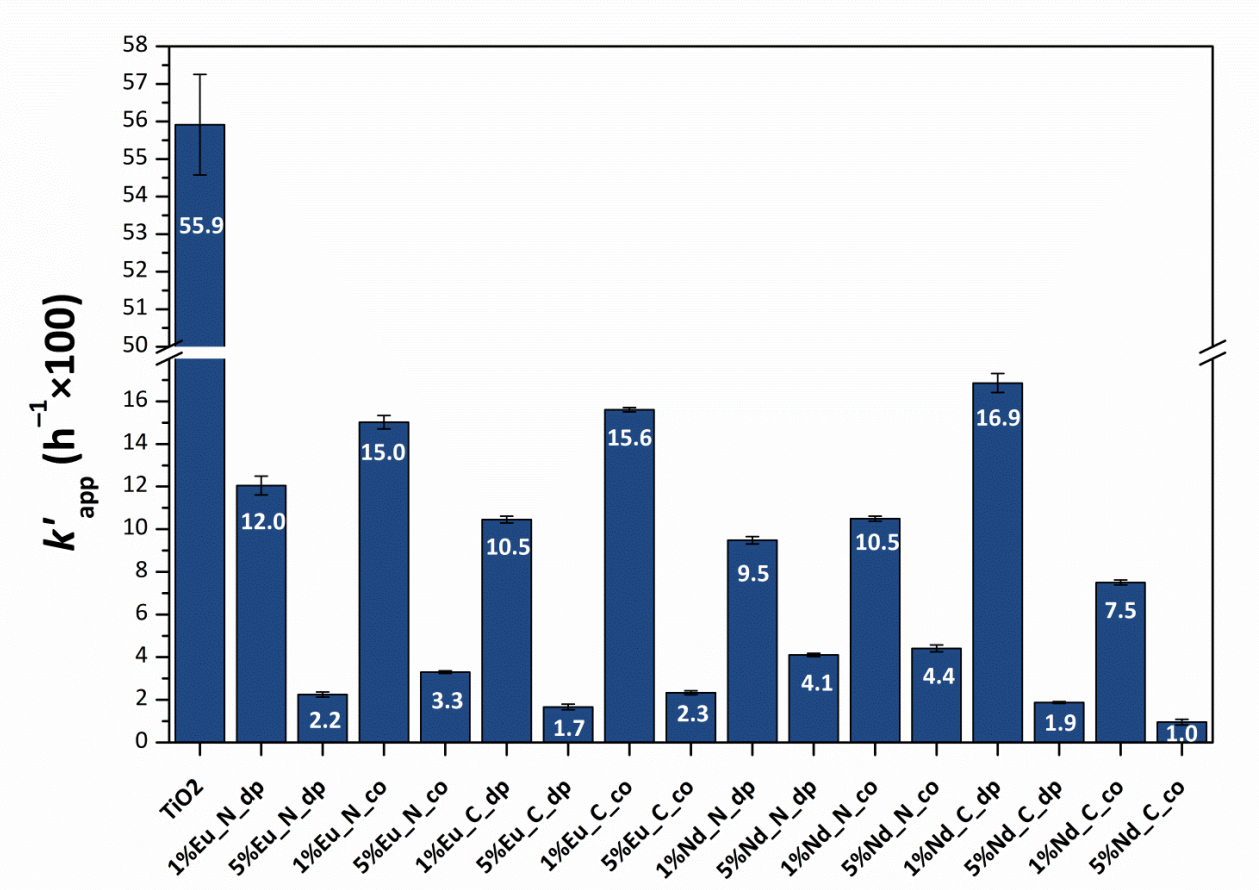

Fig. S8 – Scattered plot of the photocatalytic activity results in the gas-solid phase, monitoring the NO_x abatement. a) Using the solar lamp; b) using the white LED lamp. The horizontal dashed line represents the median value.