Electronic Supplementary Material (ESI) for RSC Advances.

Prospective aspects of preferential {001} facets of N, S co-doped TiO_2 photocatalysts for visible-light-responded photocatalytic activity

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Inductively Coupled Plasma Atomic Emission Spectrometer (ICP-AES), an analytical technique, was used to characterize the doping levels of anions (N and S) into TiO_2 crystal lattice by analyzing (i) the concentration of remaining ions in the solution after synthesis, (ii) amount of crystalline material obtained and (iii) remaining liquid solution after centrifugation. Varian model VISTA-MPX was used for ICP-AES analysis having a radial configuration. These calculations help us to estimate the actual doping levels. A 6 point standard calibration curve was obtained for each analysis by subtracting an amount of reagents before and after the hydrothermal treatments. The linear regression of the curves represent the intensities of each element with mass ratios for each synthesis.

The ICP-AES technique was used to determine the chemical composition of dopant elements (N and S) in the TiO_2 crystal lattice. The concentration of dopant elements was varied with the change of initial dosage amount of precursor reagents molar ratios as observed from the early cited reports[17][18]. Hence, ICP-AES analysis confirmed that the dopant level of sulfur and nitrogen atoms are in the range as expected from the initial concentration of reagents.

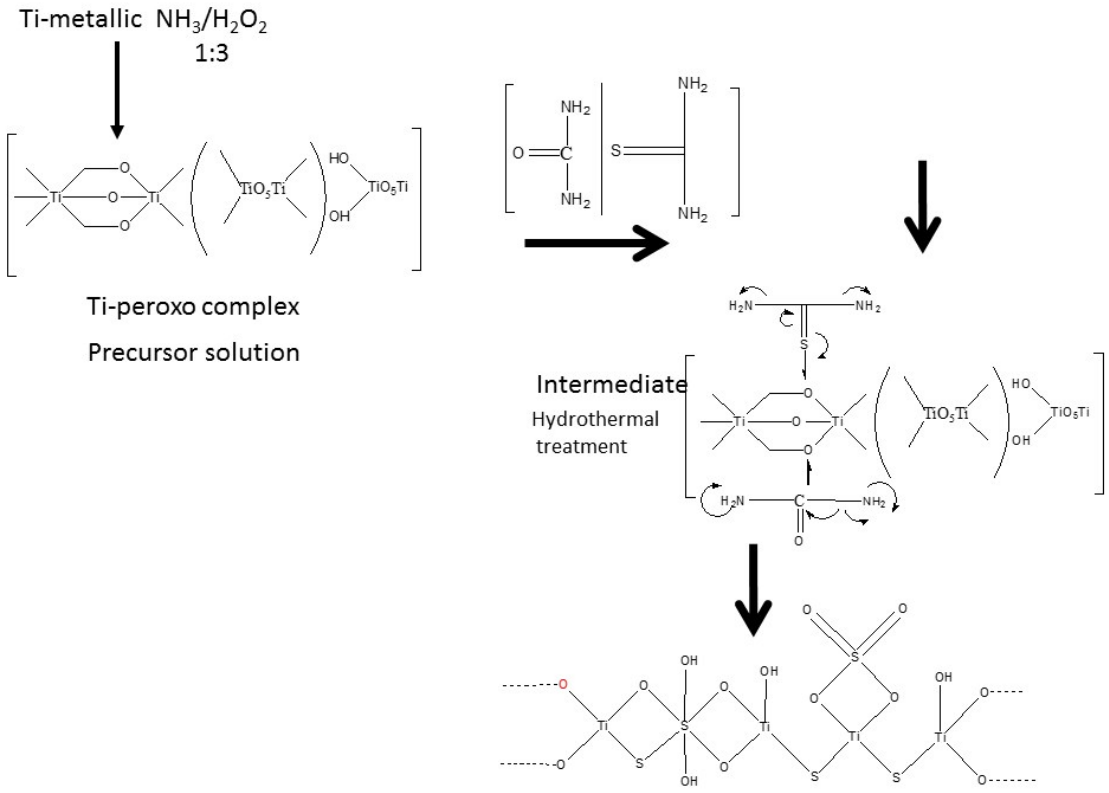

Figure 1S Schematic pathway for the incorporation of dopant elements (N and S) in the crystal lattice of TiO_2.

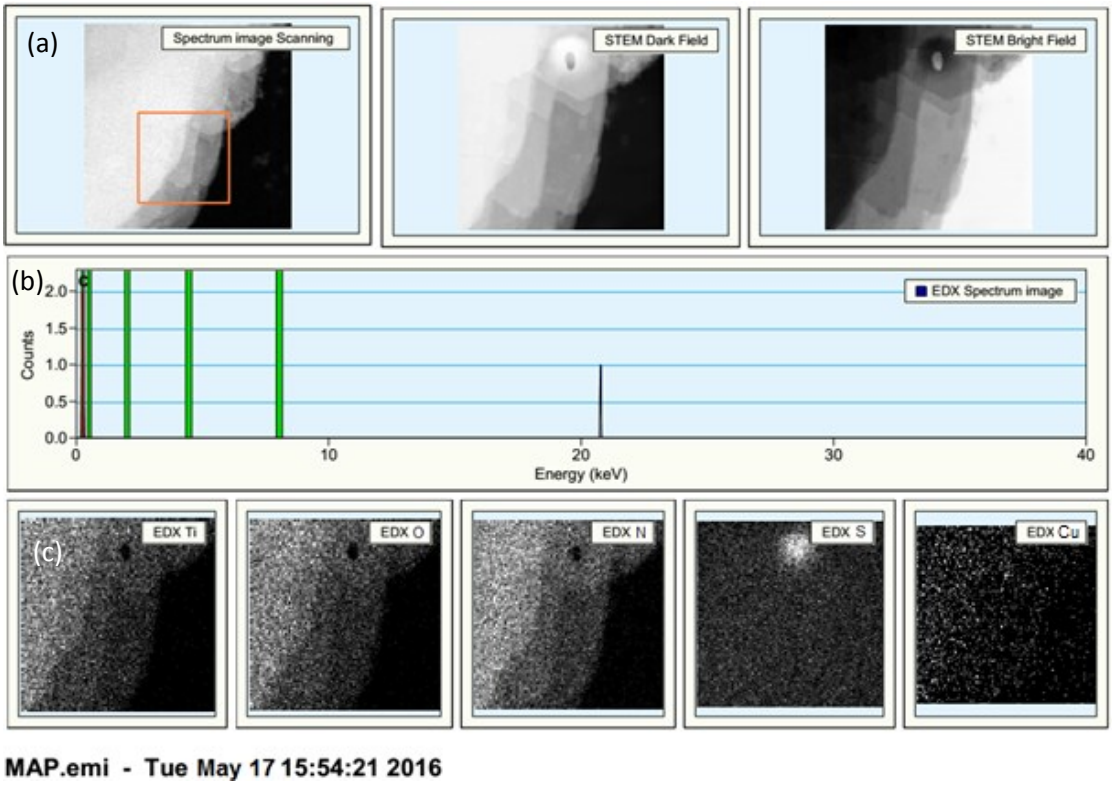

Figure 2S (a) spectrum image scanning (SIS) and STEM (bright and dark field), (b) EDX spectrum image, and (c) surface mapping for elemental analysis of the NST-2 sample.

The statistical relevance date for the elemental composition in the as-prepared samples is given in Table 1S.

Table 1S elemental composition of the dopant elements in the as-prepared NST samples.

Sample	Ti (wt%)	O (wt%)	N (wt%)	S (wt%)
NST-1	58	41	0.57	0.43
NST-2	55	43	0.95	1.05
NST-3	57	40	1.46	1.54

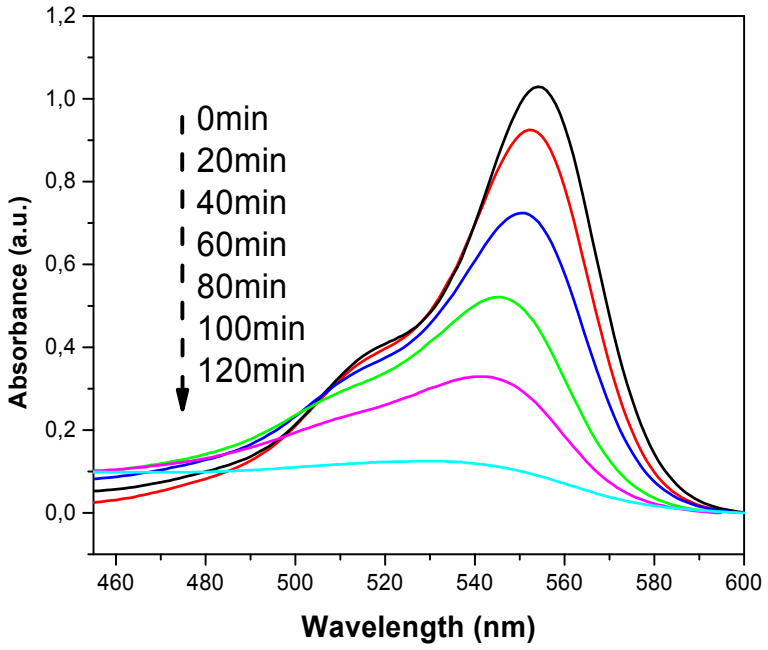

Figure 3S Change in absorbance of RhB aqueous solution over NST-2 sample under visible light irradiation.

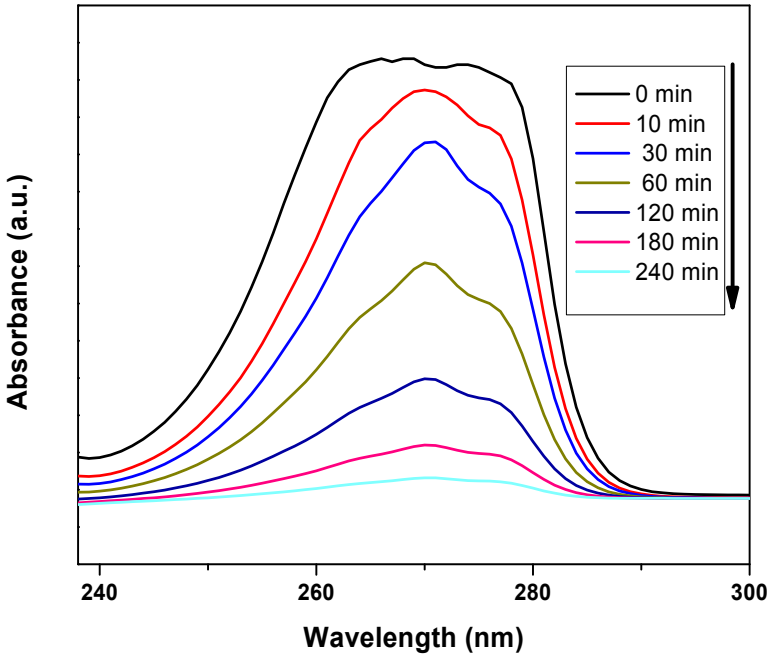

Figure 4S Change in absorption of phenol aqueous solution over NST-2 sample under visible-light irradiation.

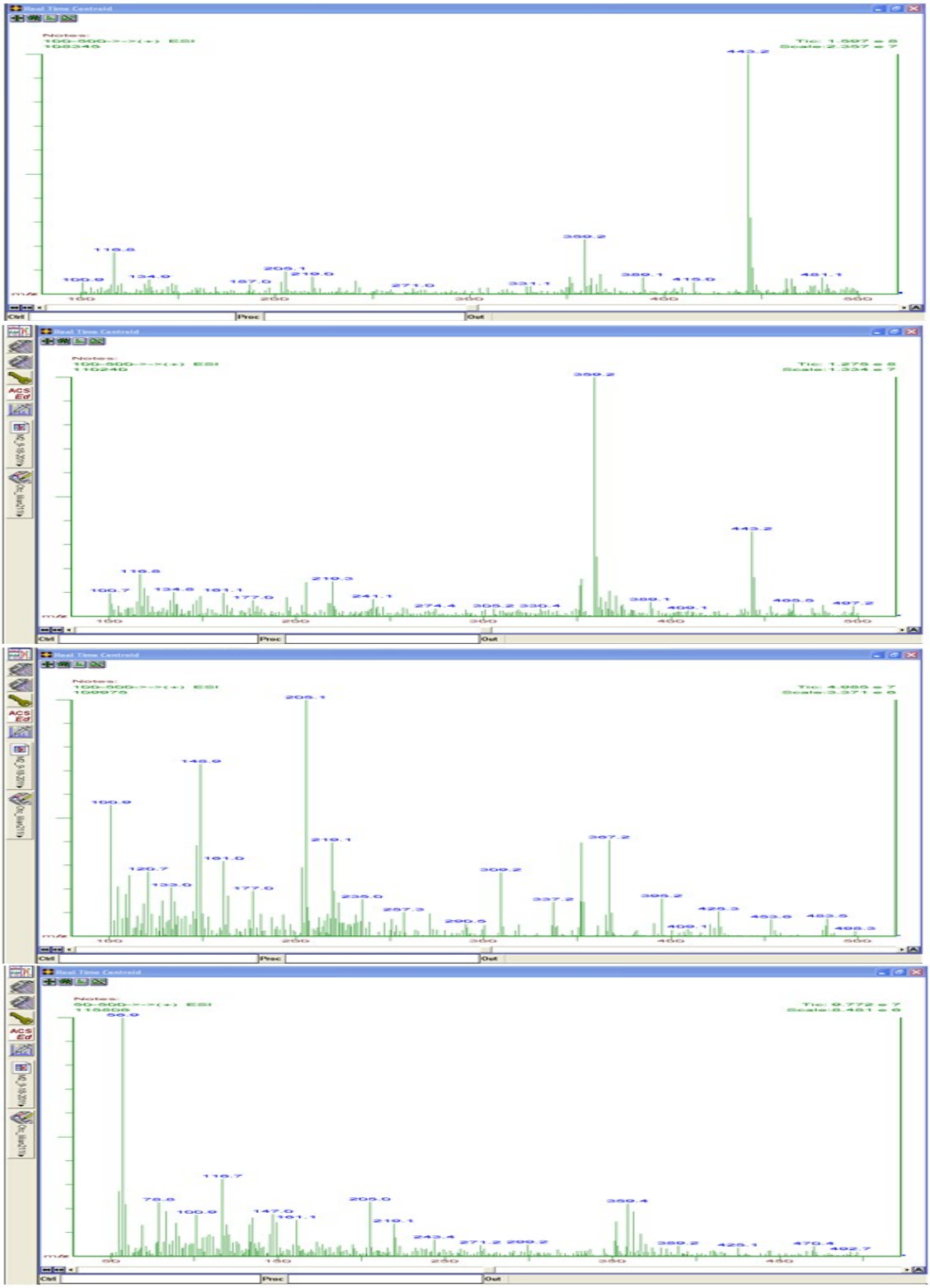

Figure 5 LC-MS spectra of the RhB for different interval of visible light irradiation.

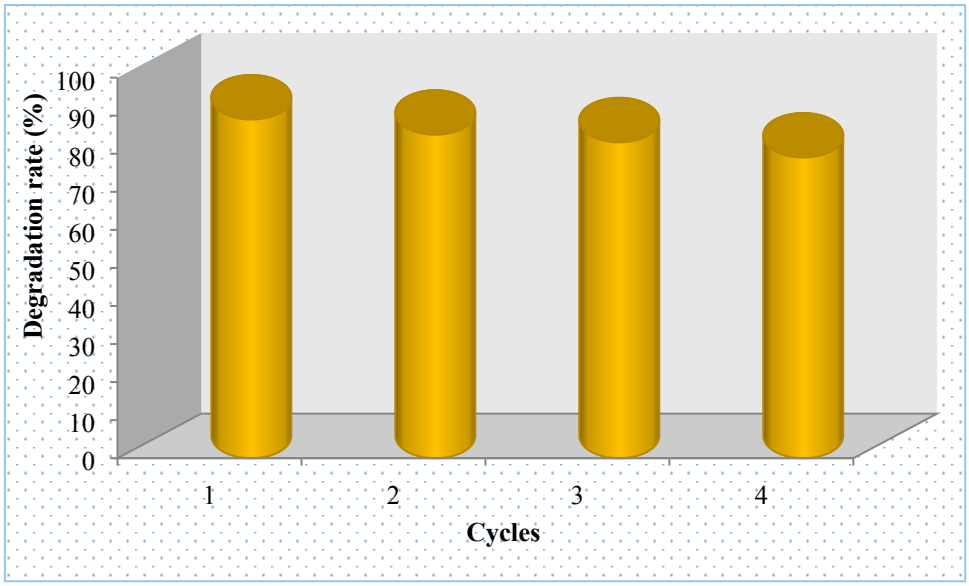

Figure 6S Recyclability of the NST-2 for the photodegradation of RhB under visible light irradiation.

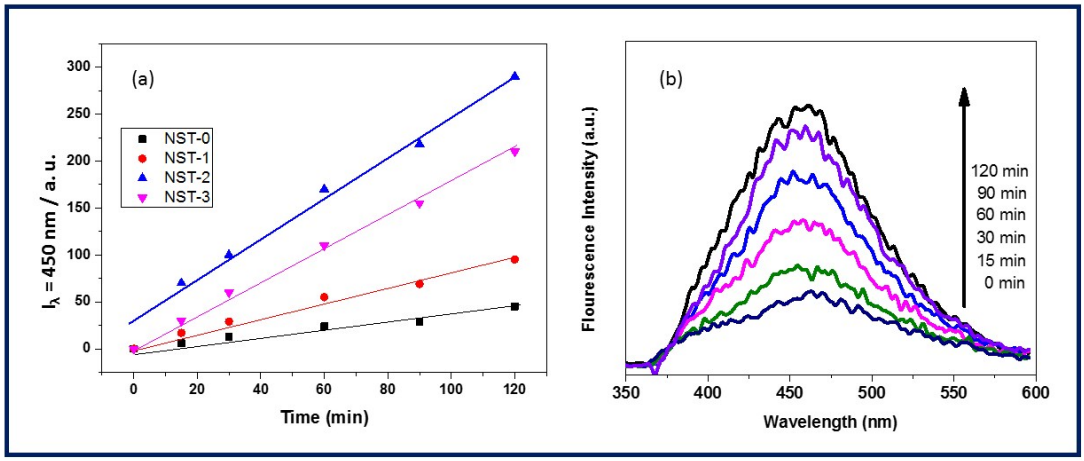

Figure 7S (a) zero-order kinetics for the formation of hydroxyl radical over as-prepared NST samples. (b) The spectra profile for the formation of 2-hydroxyterephthalic acid over representative sample.