TiO_2 nanoparticles doped SiO_2 films with ordered mesopore channels: A catalytic nanoreactor†

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Electronic Supplementary Information (ESI)

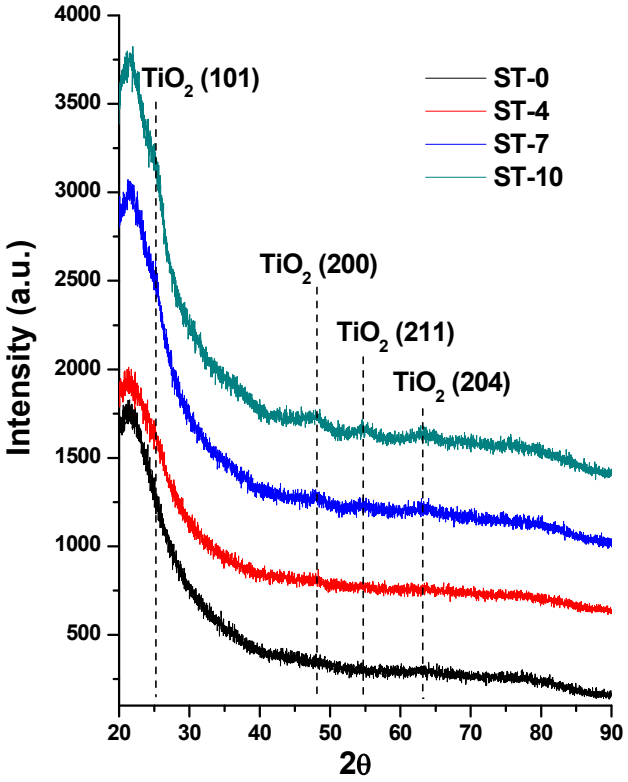

Fig. S1 High angle XRD patterns of TiO_2 doped SiO_2 films heat-treated at 350 °C. A grazing incidence angle of 0.3° was used to record the XRD patterns.

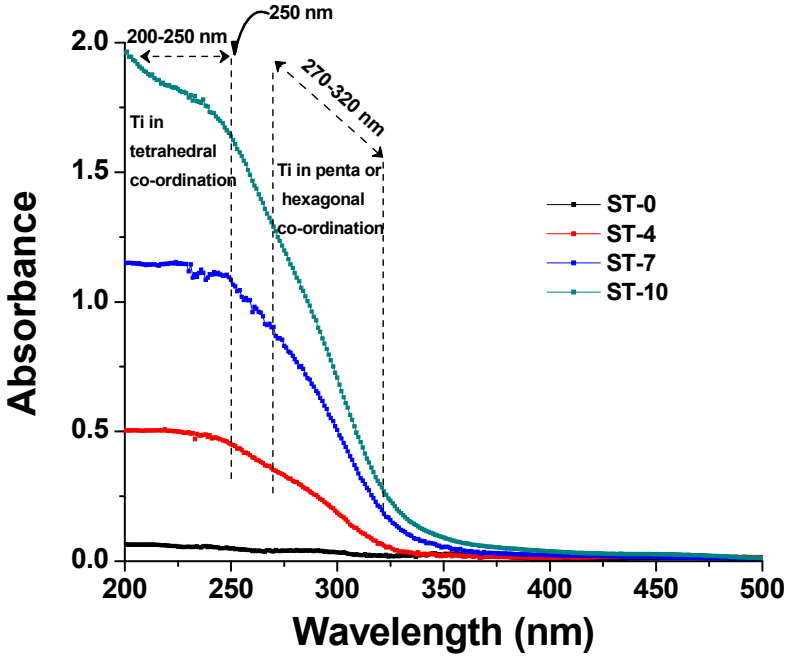

Fig. S2 UV-visible absorption spectra of TiO_2 doped SiO_2 films after heat-treatment at 350 °C; the peak assignments are given in the body of the figure.

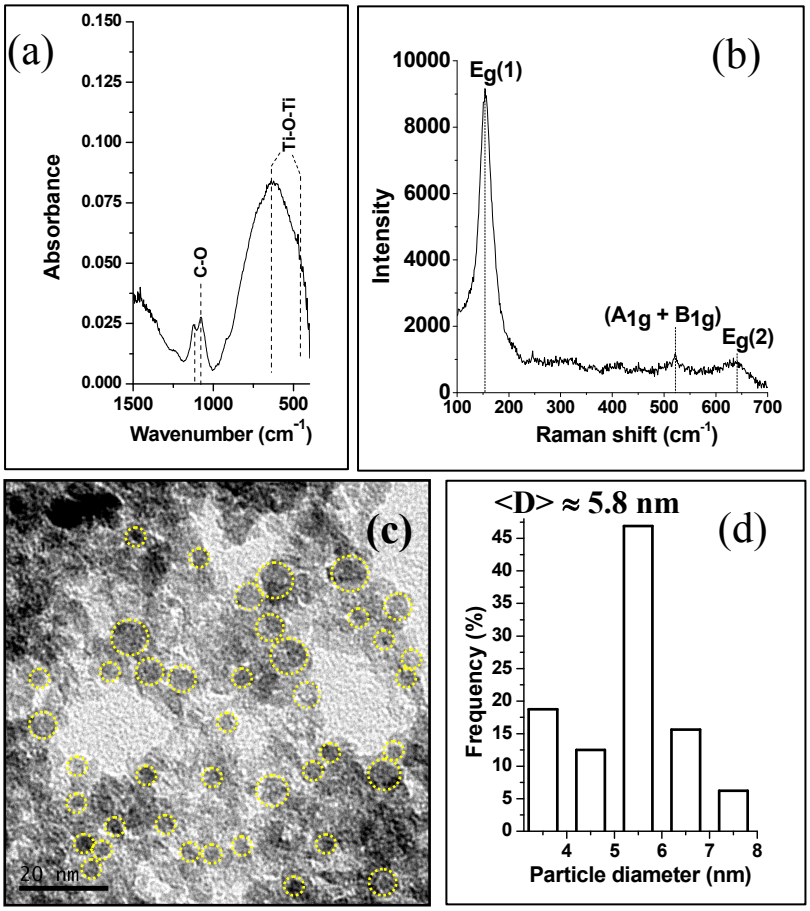

Fig. S3 (a) FTIR, (b) Raman and (c) TEM images of TiO_2 NPs dispersion used in this work. The particle size distribution (average size <D> ≈ 5.8 nm) evaluated from TEM is shown in (d).

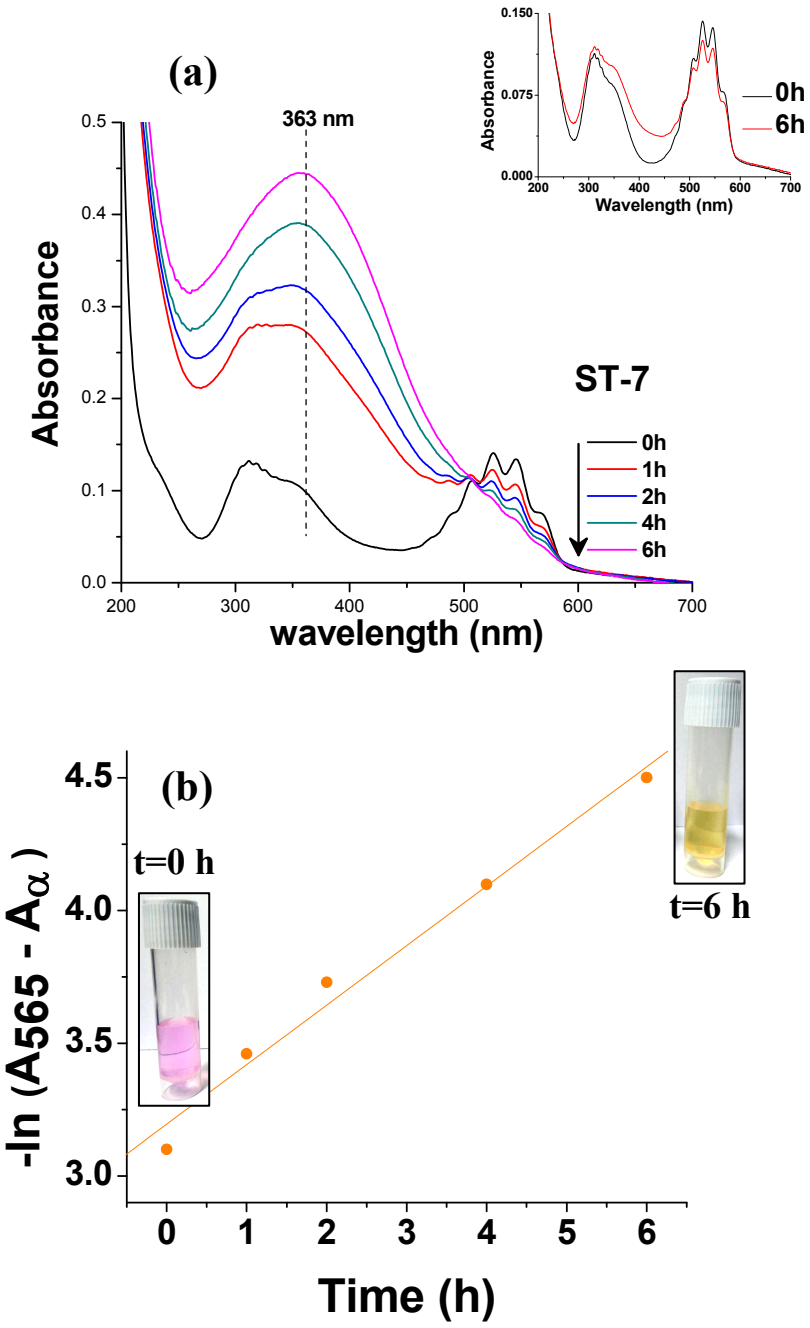

Fig. S4 (a) Evolution of UV-visible absorption spectra during the reduction of $KMnO_4$ in presence of ST–7 (7 mol% TiO_2 doped SiO_2) film catalyst at 25 °C; inset shows the UV-visible spectra of the reaction in absence of film catalyst; (b) pseudo first order plot of –ln (A_{565}-A_α) versus time for the reaction and inset shows the photos of initial ($KMnO_4$) and final (MnO_2) solutions.

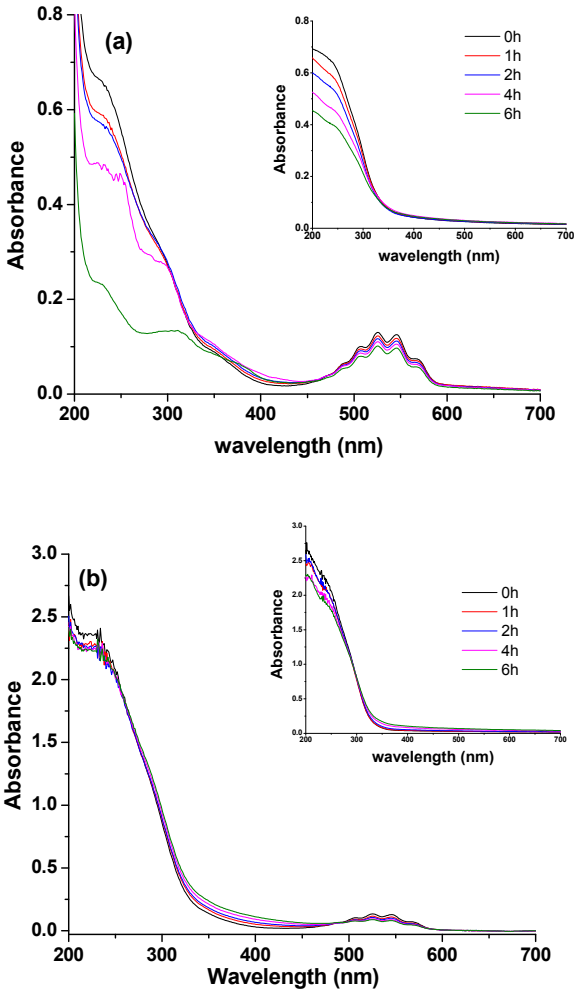

Fig. S5 UV-visible spectral evolution of aqueous $KMnO_4$ solution in presence of TiO_2 dispersion used in this work: (a) equivalent amount of TiO_2 present in the ST–7 films used for catalytic reaction and (b) 4 times concentrated TiO_2 with respect to (a). The respective insects show the spectral changes of TiO_2 dispersion in water with time in absence of $KMnO_4$.