Eletronic Supplementary Materia (ESI) for New Journal of Chemistry

Facile fabrication of sponge-like hierarchically porous Ni,La-$SrTiO_3$ templated by in-situ generated carbon deposits and the enhanced visible-light photocatalytic activity

Aizhong Jia*, Xiao Zhang, Fang Li and Yanji Wang*

Hebei Provincial Key Lab of Green Chemical Technology & High Efficient Energy Saving, School of Chemical Engineering & Technology, Hebei University of Technology, Tianjin, 300130, P.R. China

*Corresponding author: Aizhong Jia, E-mail:azhjia@hebut.edu.cn

1.Pore size distribution

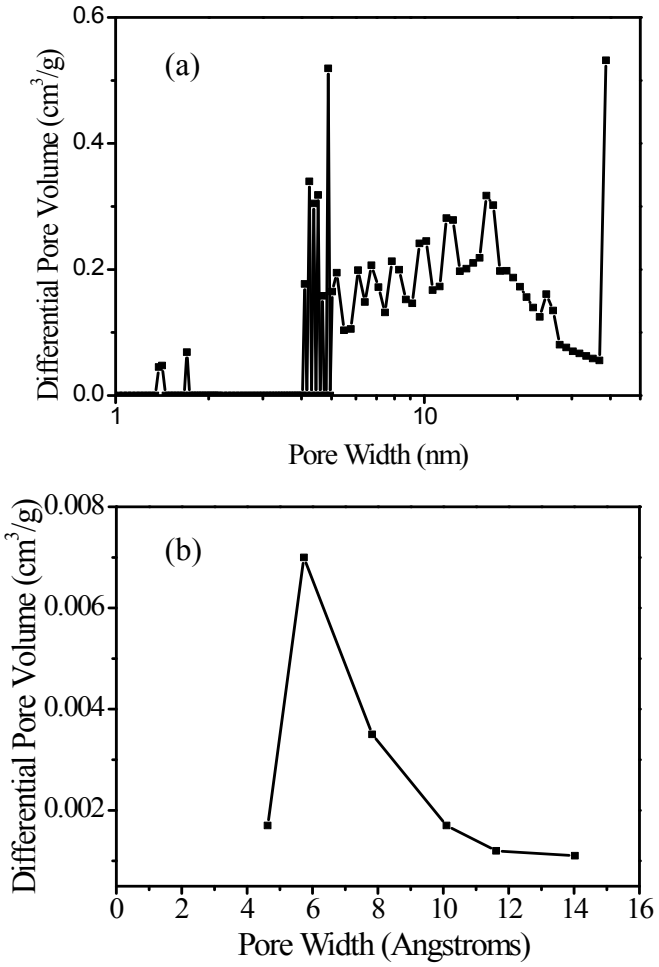

Fig. S1 Pore size distributions of as-synthesized Hp-NLSTO calculated by (a) DFT model and (b) HK model.

The pore distribution calculated by the DFT model (Fig.S1a) displays two narrow peaks centred at ~1.4 nm and ~1.7 nm, suggesting a dual micropore distribution. It also shows multimodal pore distributions in range of 4-40 nm, indicating the pore sizes are hierarchical in a region of mesopore. The pore distribution calculated by HK model is given in Fig.S1b, from which it can be seen that a pore with a diameter about 0.6 nm has been formed in the sample.

2. Absorption spectra of MG aqueous solutions

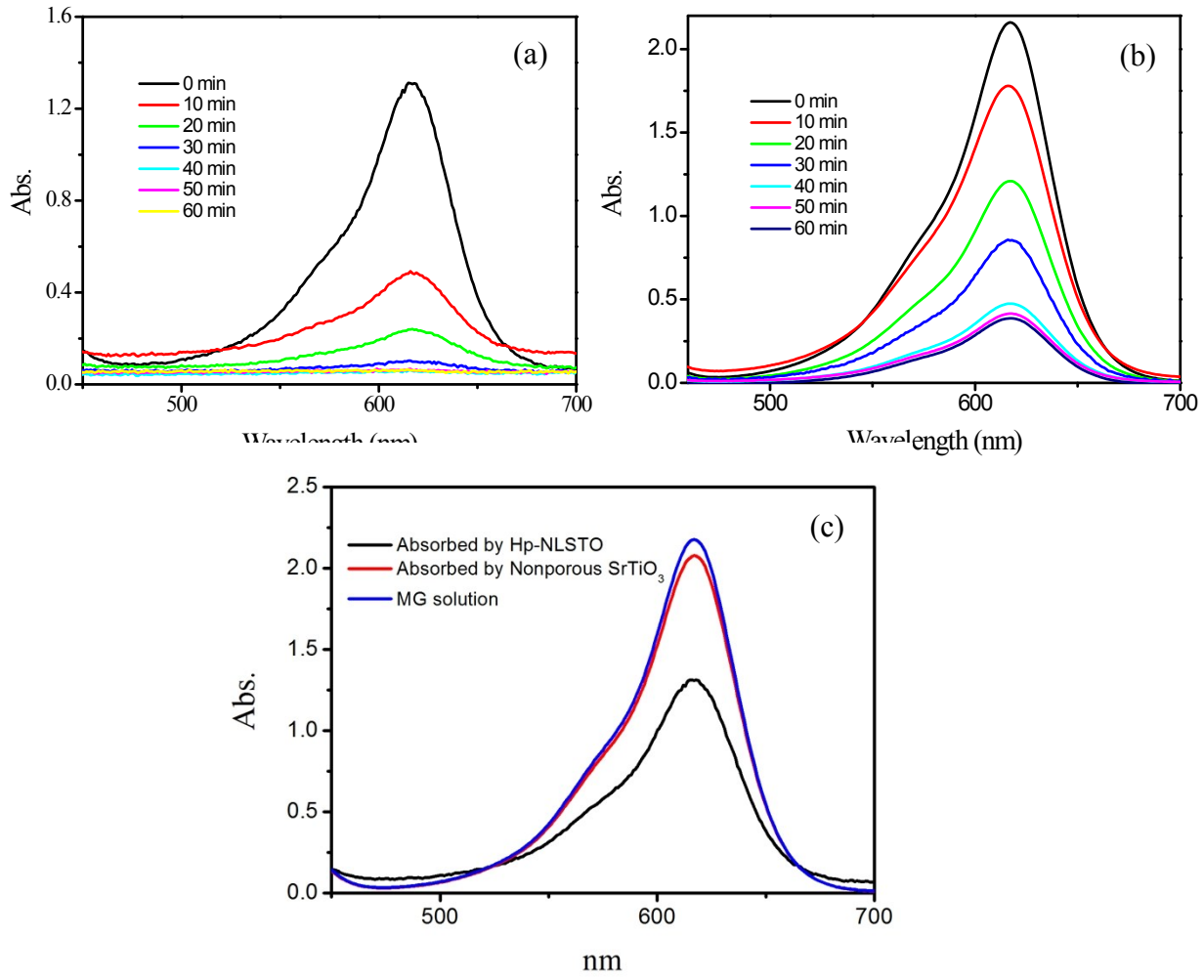

Fig. S2 The absorption spectra of MG aqueous solutions under visible light irradiation for different time with (a) Hp-NLSTO and (b) nonporous Ni,La-$SrTiO_3$; and (c) the MG aqueous solution absorbed by different catalysts.

Fig. S2(a)(b) shows the absorption spectra of the residual MG in aqueous solutions under visible light irradiation for different time in the presence of as-synthesized Hp-NLSTO or nonporous Ni,La-$SrTiO_3$. It is obvious that most of MG were degraded in 30 min for the catalyst of Hp-NLSTO; however, no more than 80% of MG was degraded for the catalyst of nonporous Ni,La-$SrTiO_3$ even irradiation by visible light for 60 min. It indicates that the hierarchical pores evidently enhanced the photocatalytic performance. It should be emphasized that the absorbency of MG

solution stirred for 30 min in dark (irradiation for 0 min) for Hp-NLSTO is weaker than that of for nonporous Ni,La-$SrTiO_3$. It is attributed to the strong adsorption properties of Hp-NLSTO. The spectra shown in Fig. S2(c) further confirms that the adsorption capacity of as-synthesized Hp-NLSTO is much higher than that of nonporous Ni,La-$SrTiO_3$.

3. The photographs of different MG solutions and different catalysts

Fig. S3 The MG aqueous solutions: (A) 20 ppm MG, (B) stirring in dark for 30 min with catalyst of Hp-NLSTO, (C) solution catalysed with nonporous $SrTiO_3$ for 60 min, (D) solution catalysed with nonporous Hp-NLSTO for 40 min and the catalysts: (a) fresh Hp-NLSTO, (b) Hp-NLSTO separated from solution B, (c) nonporous $SrTiO_3$ separated from solution C, (d) Hp-NLSTO separated from solution D.