An efficient utilization of the photogenerated electrons and holes for photocatalytic selective organic syntheses in one reaction system through narrow band gap CdS photocatalyst

Xiaofeng Ning\textsuperscript{a}, Sugang Meng\textsuperscript{a,*}, Xianliang Fu\textsuperscript{a}, Xiangju Ye\textsuperscript{b}, Shifu Chen\textsuperscript{a,b,*}

\textsuperscript{a} Department of Chemistry, Huaibei Normal University, Anhui Huaibei, 235000, People’s Republic of China.

\textsuperscript{b} Department of Chemistry, Anhui Science and Technology University, Anhui Fengyang, 233100, People’s Republic of China.

* Corresponding author, Tel: +86-550-6732001, Fax: +86-550-6732001. E-mail: chshifu@chnu.edu.cn
Fig. S1 The activity of CdS-G for photocatalytic (a): oxidation of benzyl alcohol into benzaldehyde and reduction of nitrobenzene into aniline; (b): oxidation of benzyl alcohol into benzaldehyde and reduction p-chloronitrobenzene into p-chloroaniline under visible light irradiation for 4 h.
Fig. S2 The cyclic voltammogram of (a) pMBA, (b) pMBAD and (c) NB with different concentrations (0.1, 0.2, and 0.5 mmol/L), (d) Mott–Schottky plots for the CdS-G electrodes.
Fig. S3 The GC spectra of (a) the reaction system was irradiated for 0.5 h and (b) BTF solvent contained NSB to verify the existence of NSB in the reaction process.

(1): Benzotrifluoride solvent (BTF);
(2): Impurity in BTF solvent;
(3): Nitrosobenzene (NSB);
(4): Aniline (AL);
(5): Nitrobenzene (NB);
(6): p-methoxybenzyl alcohol (pMBA);
(7) p-methoxybenzaldehyde (pMBAD).