Electronic supplementary information

Photocatalytic Studies of CdS Nanoparticles Assembled on Carbon Microsphere Surface with Different Interface Structure: From Amorphous to Graphite-like Carbon

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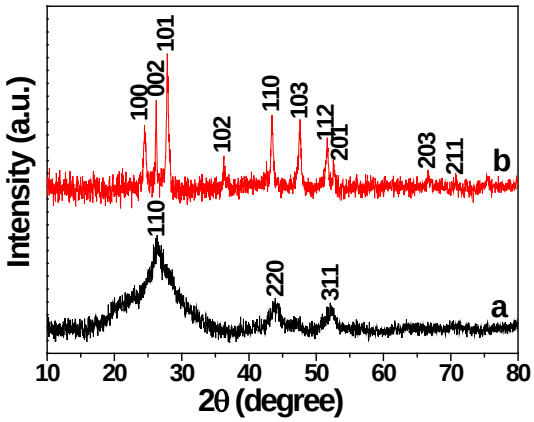

Fig. S1. XRD patterns of as-prepared pure CdS (a) and calcinations at 300^0C in N_2 flow (b).

The adsorbability of RhB using different carbon microspheres obtained at different calcination temperature as adsorbent is tested and shown in Fig. S2 The carbon microspheres obtained at temperatures of 300, 400, 500, 600, 700, and 800^0C were named as C-300, C-400, C-500, C-600, C-700, and C-800, respectively, and original sample without calcinations was named C-0. 0.04 g of as-prepared samples as absorbents were added into 100 mL of RhB solution (concentration: 5 mg/L). After being dispersed in an ultrasonic bath for 5 min, the solution was stirred for 2 h in the dark and measured the RhB absorption concentration by UV-vis spectroscopy. It can be seen that about 36.1, 6.7, 7, 5.7, 2.6, 0.9 and 0.3% of RhB solution were adsorbed

by carbon microspheres at 0, 300, 400, 500, 600, 700, 800^{0}C, respectively. We now attribute this to the changing hydrophilicity of the carbon surface. That is the surface of carbon spheres is relatively hydrophilic and has a distribution of -OH and C=O groups before calcinations (Ref.22). However, after heat treatment in N_2 flow, these groups will be significantly decreased, due to the thermal decarboxylation and dehydration during the higher temperature calcination process (see Ref. 24). Thus, the absorb capacity of the carbon will rapidly weaken after calcinations.

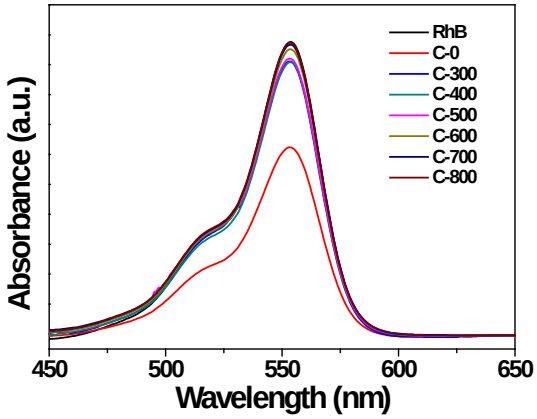

Fig.S2. The absorption spectra of the RhB solution with C microspheres at different calcination temperature as adsorbents.

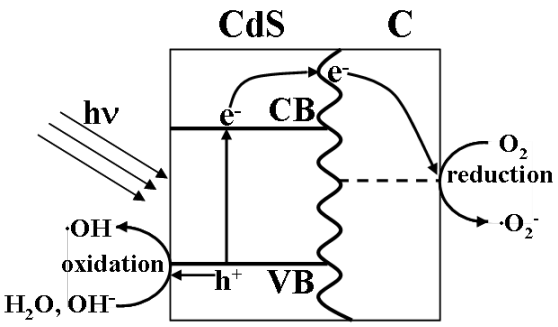

Fig. S3. Schematic diagram representing the charge-transfer process in C/CdS core-shell hybrid microspheres.

The surface area of the as-prepared pure carbon microspheres, sample S-0 and S-800 are measured by the BET method using a Quantachrome Autosorb-1 apparatus. All samples were degassed at 150^0C for 4 h and the adsorbate gas was 99.9% N_2. The pure carbon microspheres and sample S-0 have a similar specific surface area of 7.74 and 6.98 m^2/g.