Supplementary Information

A Facile Green Antisolvent Approach to Cu²⁺-doped ZnO Nanocrystals with Visible-Light-Responsive Photoactivities

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Fig. S1 (a) TEM image, (b) SAED pattern and (c) HRTEM image of pure ZnO nanocrystals obtained from antisolvent process.
Fig. S2 XPS spectra of Cu$^{2+}$-doped ZnO nanocrystals before and after 8 runs of photoelectrochemical measurement. The Zn 2p signals were consistent with the presence of ZnO with the binding energy of 1022 and 1045 eV for Zn 2p$_{1/2}$ and Zn 2p$_{3/2}$, respectively. The deconvolution of O 1s produced two peaks which were assigned to the O-H species (533 eV) and Zn-O bonding (531 eV).[1] No appreciable change in the binding energy of Zn 2p and O 1s was observed upon 8 runs of measurement. Each run contained an I-t scan for an on/off cycle of light illumination (200 sec).
Fig. S3 UV-visible absorption spectra of the pure ZnO and Ni$^{2+}$-doped ZnO nanocrystals. The inset shows an SEM image of Ni$^{2+}$-doped ZnO.

Fig. S4 Magnetic hysteresis curves of the pure ZnO and Cu$^{2+}$-doped ZnO nanocrystals with different Cu$^{2+}$ concentrations measured at 300K. Well-defined hysteresis loops were observed in the Cu$^{2+}$-doped ZnO, indicative of the phenomenon of the room temperature ferromagnetism. Due to promoted coupling of Cu$^{2+}$ with the host lattice,[2] saturation magnetization is enhanced with increasing Cu$^{2+}$ concentrations.

References