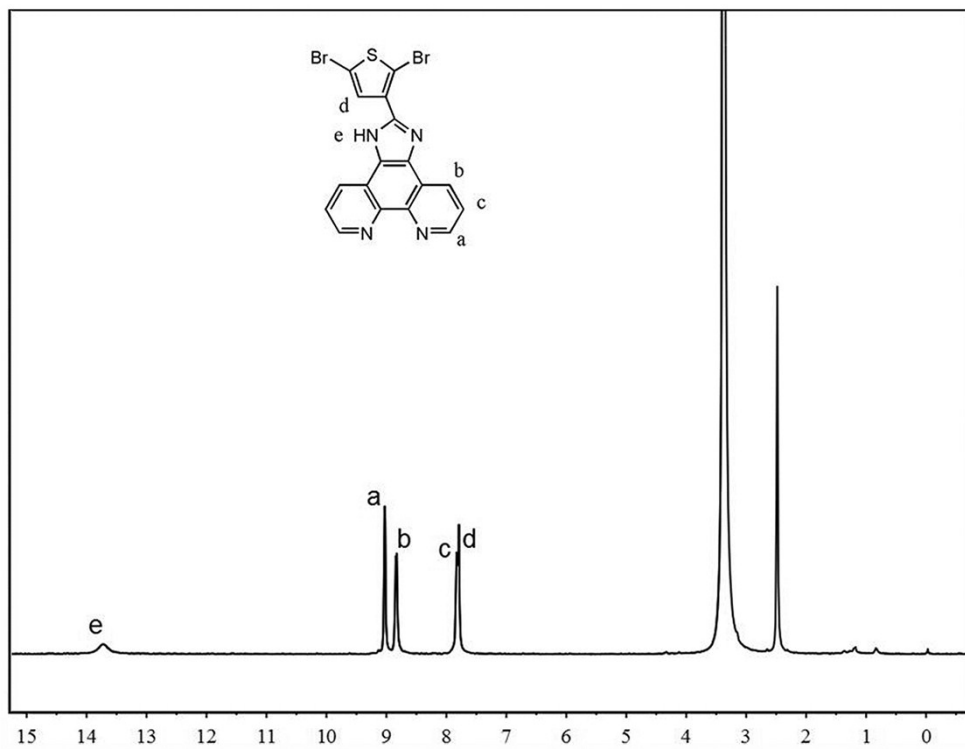


## Support information

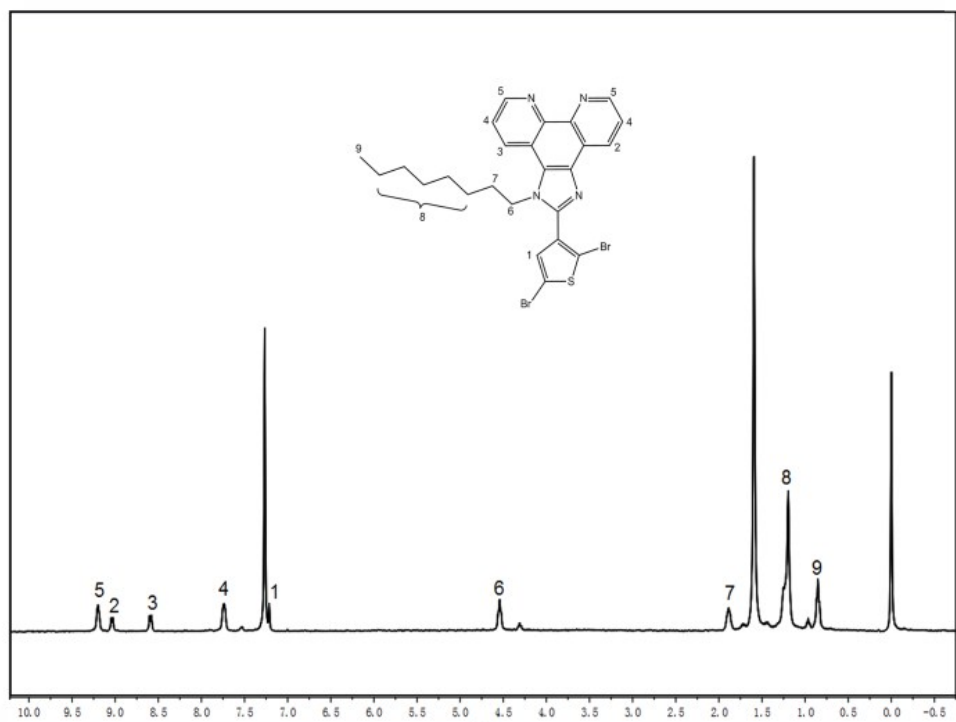
Effect on Absorption and Electron Transfer by Using Cd(II) or  
Cu(II) Complexes with Phenanthroline as Auxiliary Electron  
Acceptors(A) in D-A- $\pi$ -A Motif Sensitizers for Dye-sensitized  
Solar Cells

Chang Xia,<sup>a</sup> Chunxiao Zhu,<sup>a</sup> Xiaomei Zhao,<sup>a</sup> Xu Chen,<sup>a</sup> Tianqi  
Chen,<sup>a</sup> Ting Wan,<sup>a</sup> Zehua Xu,<sup>a</sup> Gaofeng Wen,<sup>a</sup> Yong Pei,<sup>\*a</sup>  
Chaofan Zhong<sup>\*a</sup>

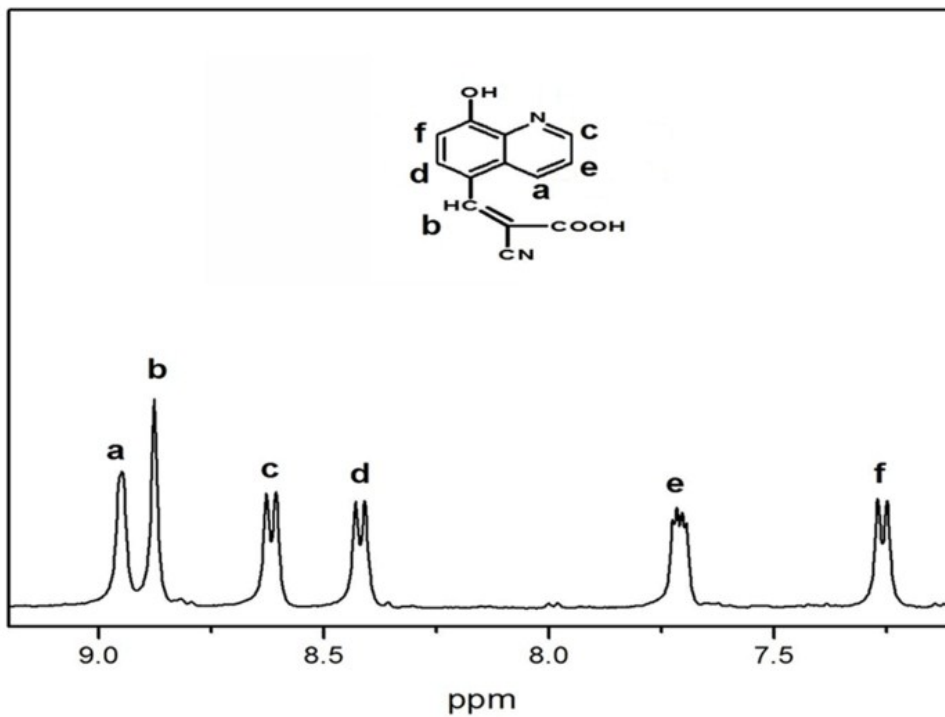
<sup>a</sup>Key Laboratory of Environmentally Friendly Chemistry and Applications of  
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Hunan 411105, China.



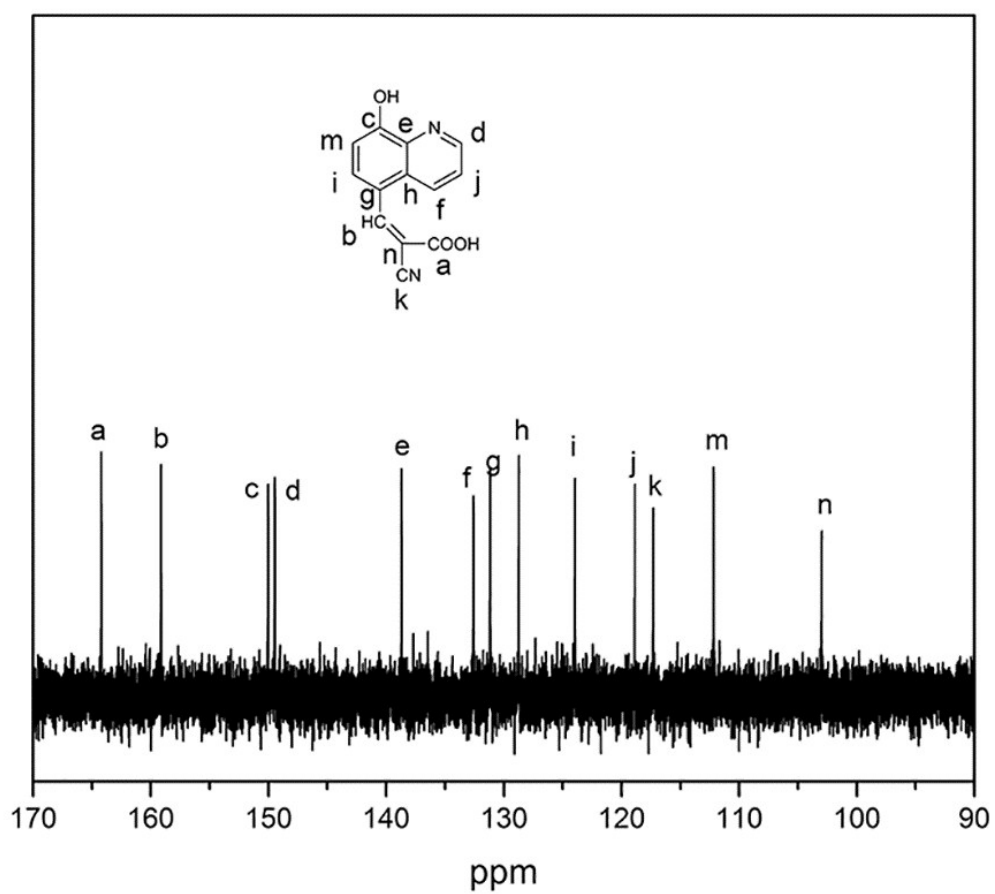
**Figure S1**  $^1\text{H}$  NMR spectra of compound **3** in  $\text{DMSO-}d_6$  solution



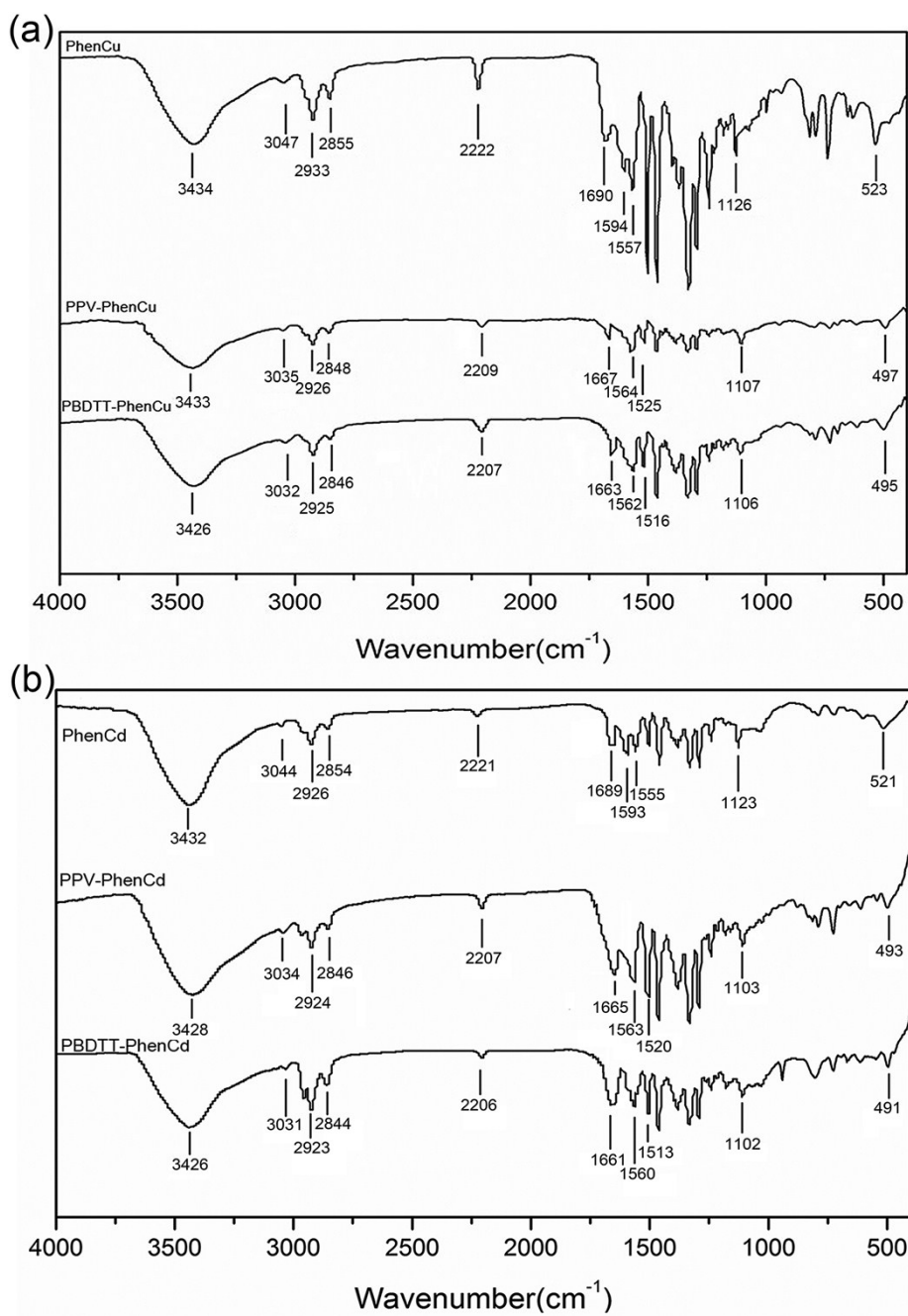
**Figure S2**  $^1\text{H}$  NMR spectra of compound **4** in  $\text{CDCl}_3-d_6$  solution



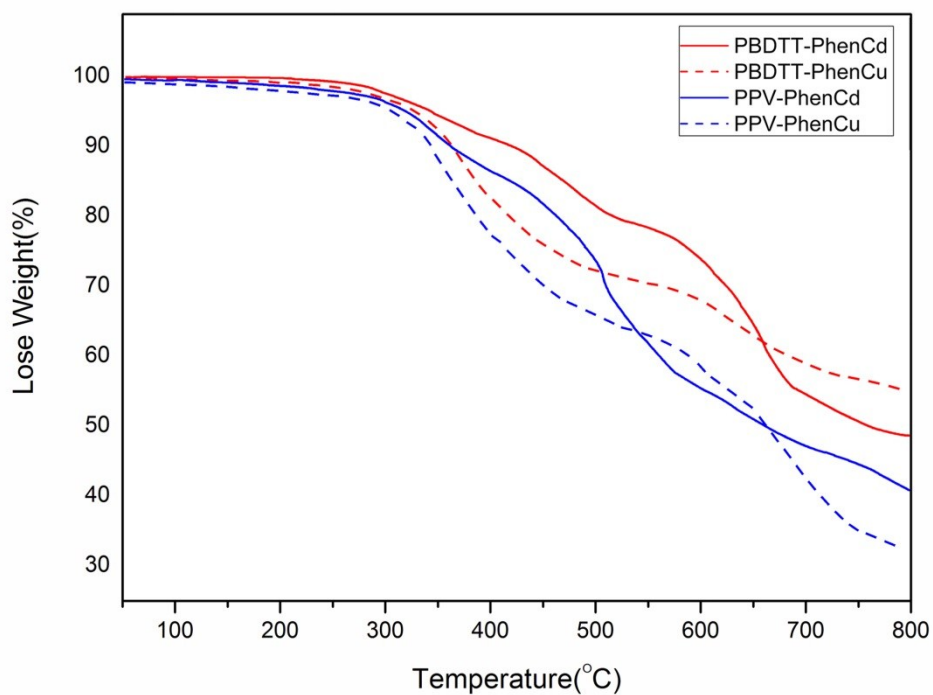
**Figure S3a**  $^1\text{H}$  NMR spectra of compound **6** in  $\text{DMSO-d}_6$  solution



**Figure S3b**  $^{13}\text{C}$  NMR spectra of compound **6** in  $\text{DMSO-d}_6$  solution



**Figure S4** FT-IR spectra of (a) **PhenCu**, **PPV-PhenCu**, **PBDTT-PhenCu** and (b) **PhenCd**, **PPV-PhenCd**, **PBDTT-PhenCd** with KBr pellet method.



**Figure S5** TGA curves of polymers **PBDTT-PhenCu**, **PBDTT-PhenCd**, **PPV-PhenCu** and **PPV-PhenCd** with a heating rate of  $20\text{ }^{\circ}\text{C min}^{-1}$  under nitrogen atmosphere.