Electronic Supplementary Material (ESI) for Catalysis Science & Technology

Supporting Information

Tetra(4-carboxyphenyl)porphyrin for Efficient Cofactor Regeneration under Visible Light and Its Immobilization

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Scheme S1 Molecular structures of (a) TCPP, (b) ZnTCPP and (c) EY.
**Fig. S1** Reaction kinetic curves of visible light-driven NADH regeneration using (a) TCPP, (b) ZnTCPP or (c) EY as a photosensitizer. TEOA concentration was 1 mM.

**Fig. S2** Change in the value of $A_{415}$ (a) in the process of TCPP adsorption on different supports and (b) for different immobilized TCPP systems with the regeneration reaction proceeded.
Fig. S3 SEM photos of (a) SiO$_2$@SH, (b) PDA/PEI-SiO$_2$@SH, (c) TCPP-PDA/PEI-SiO$_2$@SH, (d) SiO$_2$@OH, (e) PDA/PEI-SiO$_2$@OH and (f) TCPP-PDA/PEI-SiO$_2$@OH.

Fig. S4 TEM photos of (a) SiO$_2$@SH, (b) PDA/PEI-SiO$_2$@SH and (c) TCPP-PDA/PEI-SiO$_2$@SH.
**Fig. S5** FTIR spectra of (a) SiO$_2$@SH, (b) SiO$_2$@OH and (c) TiO$_2$ after PDA/PEI modification and TCPP adsorption.

**Fig. S6** FTIR spectra of SiO$_2$@OH microspheres after APTES modification and TCPP adsorption.
Scheme 2 Schematic diagram of a visible light-driven NADH regeneration system in the presence of TCPP with TEOA as an electron donor. HOMO and LUMO are the highest occupied molecular orbital and lowest unoccupied molecular orbital, respectively.