Figure S1. (a) FT-IR and (b) XRD spectrum of the “soluble” PB. The IR and XRD peaks are good consistence with the previous reports for soluble PB$^{1-3}$. The broad diffraction in the XRD spectrum was due to the scattering from the substrate.

Figure S2. $\pi$-A isotherms for $p$(DDA/Fc), $p$(DDA/Ru), and $p$(DDA/DONH) measured at 20 °C.
Figure S3. Photocurrent response for the heterodeposited film after carrying out the 0 → 1.2 → 0 V potential scan at 10 mV s⁻¹. Conditions: potential 0 V vs Ag/AgCl; light intensity, 32 mW cm⁻².

Figure S4 SEM image of PB nanoparticles immobilized onto a ITO substrate using p(DDA/DONH) as a template. (a) before CV measurement. (b) after 5 cycles of charging-discharging process.
Figure S5. Photocurrent response for the hybrid heterodeposited film after carrying out the
0 → 1.2 → 0 V potential scan at 10 mV s⁻¹ scan rate. Conditions: potential 0 V vs Ag/AgCl; light
intensity, 32 mW cm⁻²

Figure S6 (a) cyclic voltammograms for p(DDA/Fc) monolayer on the ITO electrode with various scan
rates. (b) Plots of anodic peak current vs scan rate for p(DDA/Fc)