

# Supporting Information

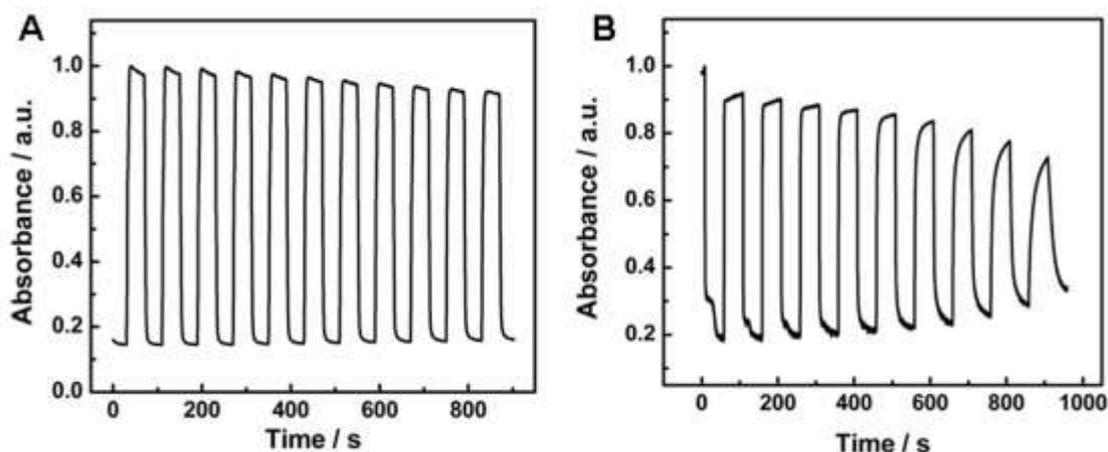
## Self-powered controlling fluorescence switch systems based on biofuel cells

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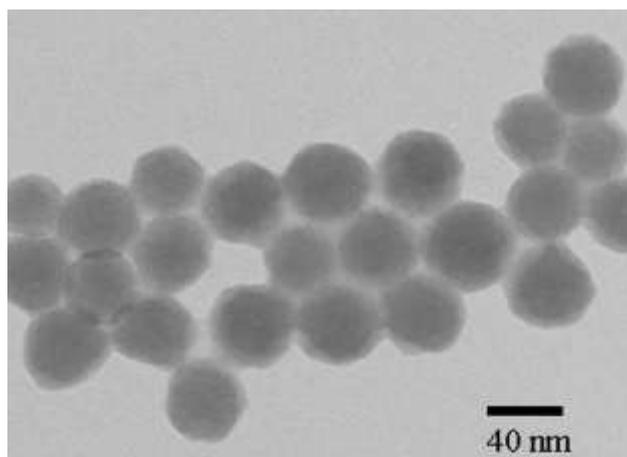
<sup>‡</sup>These authors contributed equally.

### Figure

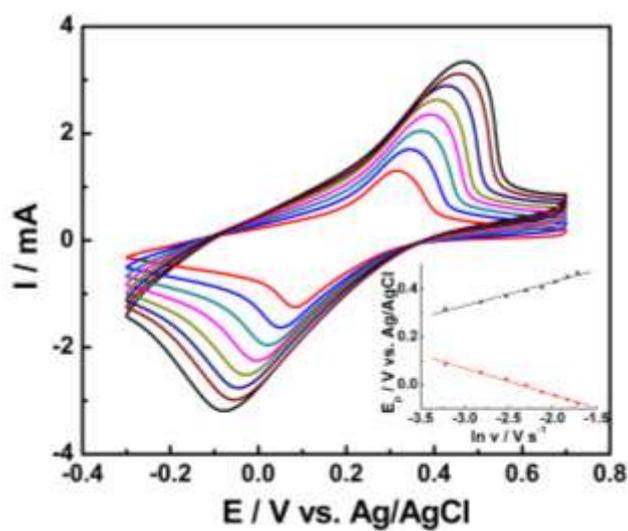


**Figure S1** The absorption response versus time during consecutive switch cycles (0 V/0.5 V vs Ag/AgCl) in pH 6 (A) and (B) pH 6.5 buffer solution.

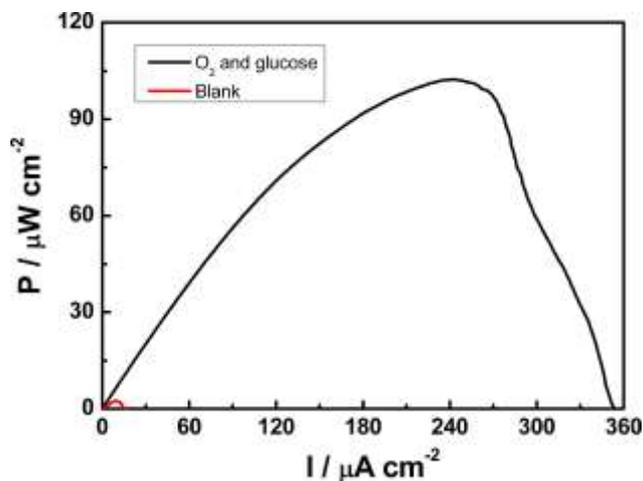
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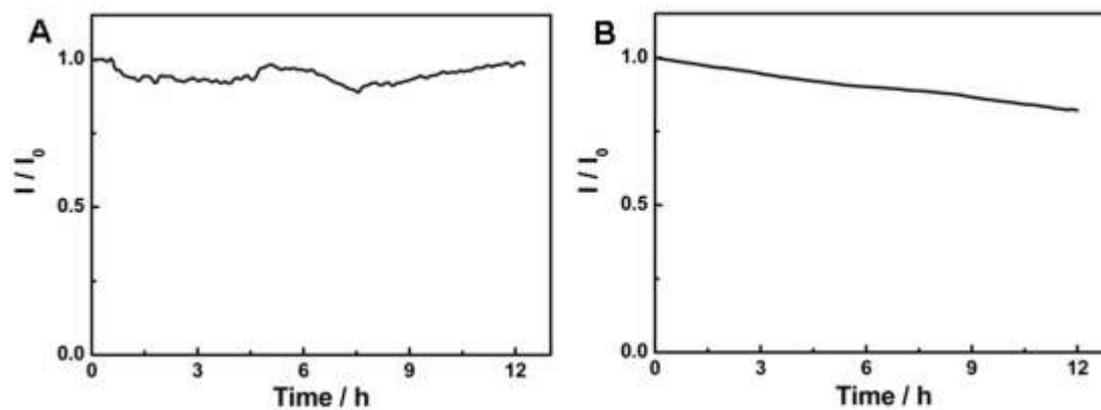
**Figure S2** Transmission electron microscope images of  $\text{Ru}(\text{bpy})_3^{2+}$ -doped silica nanoparticles.



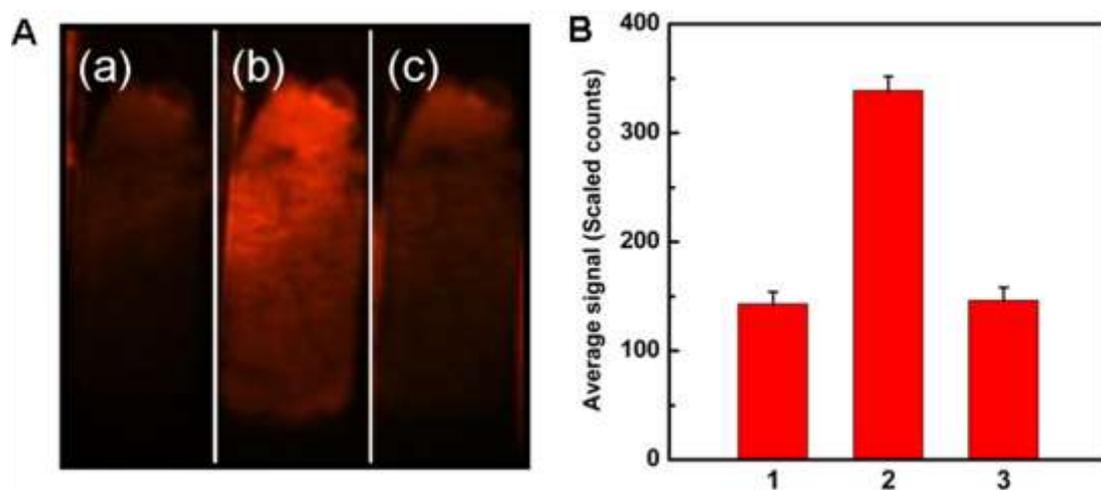
**Figure S3** Cyclic voltammograms at different scan rates (40, 60, 80, 100, 120, 140, 160, 180 mV/s) of the prepared hybrid films on the ITO electrode. Inset: the fitted linear lines of the  $E_p$  versus  $\ln(v)$ .



**Figure S4** Power density for biofuel cell based on bioanode and biocathode.



**Figure S5** (A) The stability of the bioanode current output continuously operating at +0.1 V. (B) The stability of the biocathode current output continuously operating at +0.3 V.



**Figure S6** (A) Fluorescence switch pictures imaged by Maestro 500FL in vivo imaging system. (a): in the open circuit; (b): connection with the bioanode; (c): connection with the biocathode. (B) Semi-quantitative fluorescence intensities of each state averaged over its sectional area.