Supporting Information

IR peaks present at 1701 and 1584 cm\(^{-1}\) for the 1 protonated black dye powder (Fig. S1) are assigned to the –COOH and –COO\(^-\) groups, respectively. After the dye was adsorbed onto the TiO\(_2\) surface, the –COO\(^-\) peak at 1592 cm\(^{-1}\) was observed but the –COOH peak disappeared in both untreated and HCl pretreated dye-loaded film (Fig. S2). We conclude that the black dye binds to the TiO\(_2\) surface in a carboxylate mode in both cases.

![Fig. S1. FTIR spectrum for 1 protonated black dye powder.](image)

![Fig. S2. FTIR spectra for dye-loaded untreated (electrode A) and HCl pretreated (electrode B) TiO\(_2\) films.](image)