Supplementary Information

Improvements in Photoelectric Performance of Dye-sensitised Solar Cells Using Ionic Liquid-modified TiO_2 Electrodes

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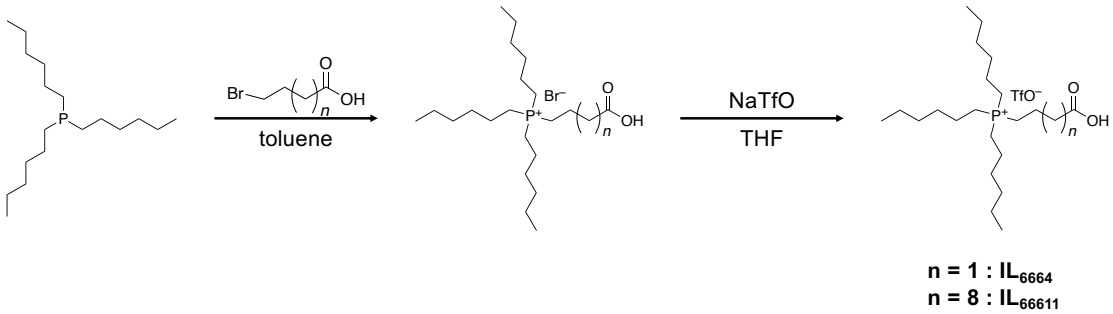
Figure S12. EIS spectra of TiO_2 substrates modified with **N3** and **N3**+**IL$_{66612}$** in 0.1 M TBAP CH_3CN solution at –0.6 V and several parameters obtained by curve-fitting using the equivalent circuit shown in Figure S13.

Figure S13. The equivalent circuit for the TiO_2 substrates modified with **N3** and **N3**+**IL$_{66612}$**. R_{ct1} and C_{dl1} mean the resistance and capacitance of the interface between FTO and TiO_2 electrodes. R_{ct2} and C_{dl2} mean those of the interface between the TiO_2 surface and the electrolyte solution. R_s is the resistance of the electrolyte solution.



Scheme S1. Preparation of $\mathbf{IL_{6664}}$ and $\mathbf{IL_{66611}}$.

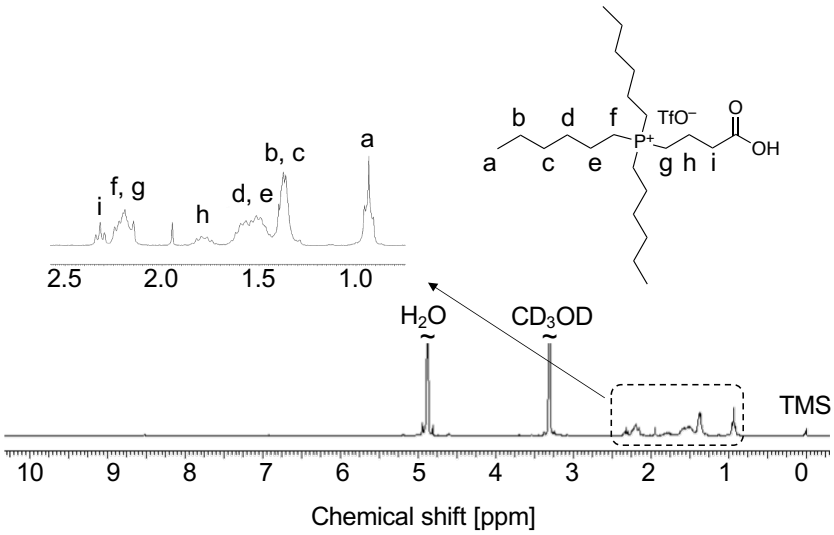


Figure S1. ^{1}H NMR spectrum of **IL$_{6664}$** in CH_3OD.

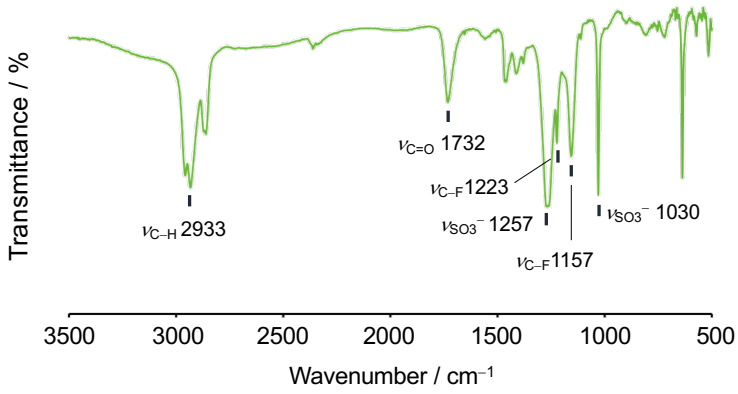


Figure S2. FT-IR spectrum of **IL$_{6664}$** (KBr pellet).

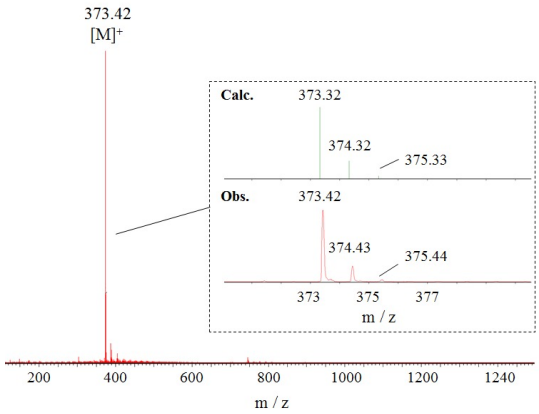


Figure S3. ESI-TOF mass spectrum of **IL_{6664}** (positive mode).

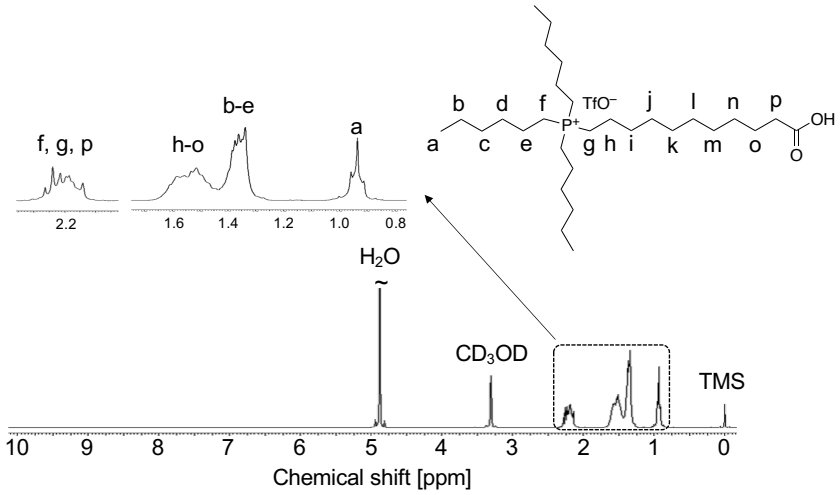


Figure S4. ^{1}H NMR spectrum of **IL$_{66611}$** in CD_3OD.

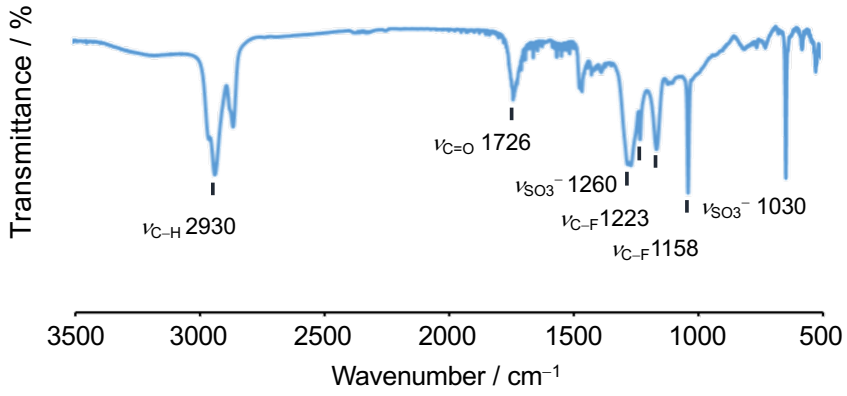


Figure S5. FT-IR spectrum of **IL$_{66611}$** (KBr pellet).

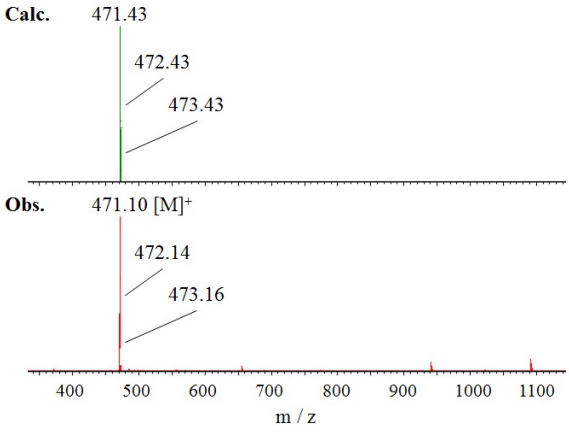


Figure S6. ESI-TOF mass spectrum of **IL$_{66611}$** (positive mode).

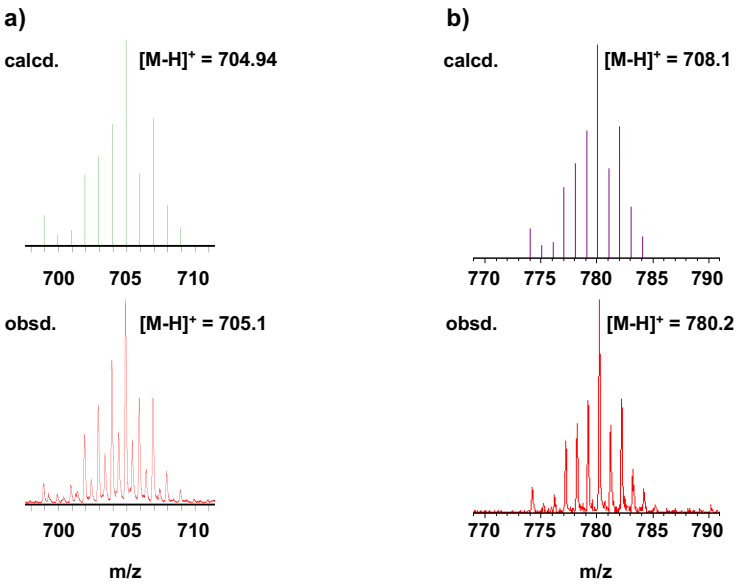


Figure S7. ESI-TOF mass spectrum of a) **N3** and b) **J13** dyes (negative mode).

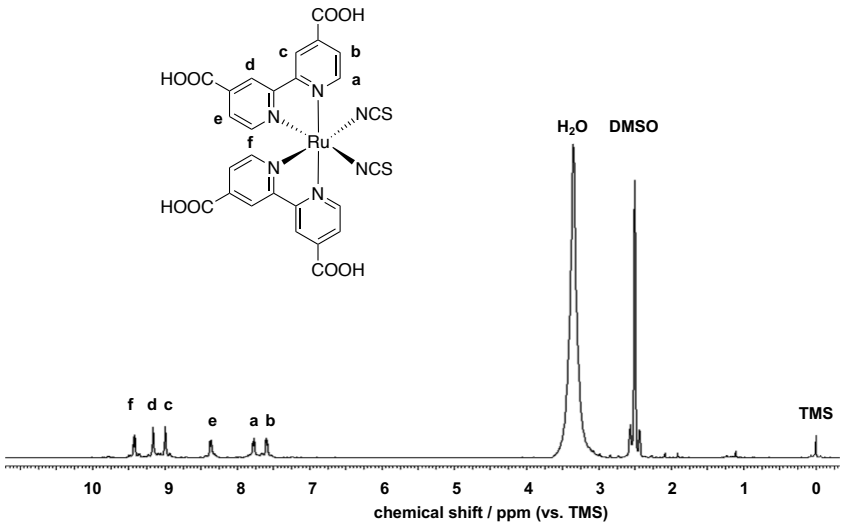


Figure S8. ^{1}H NMR spectrum of **N3** in CD_3OD.

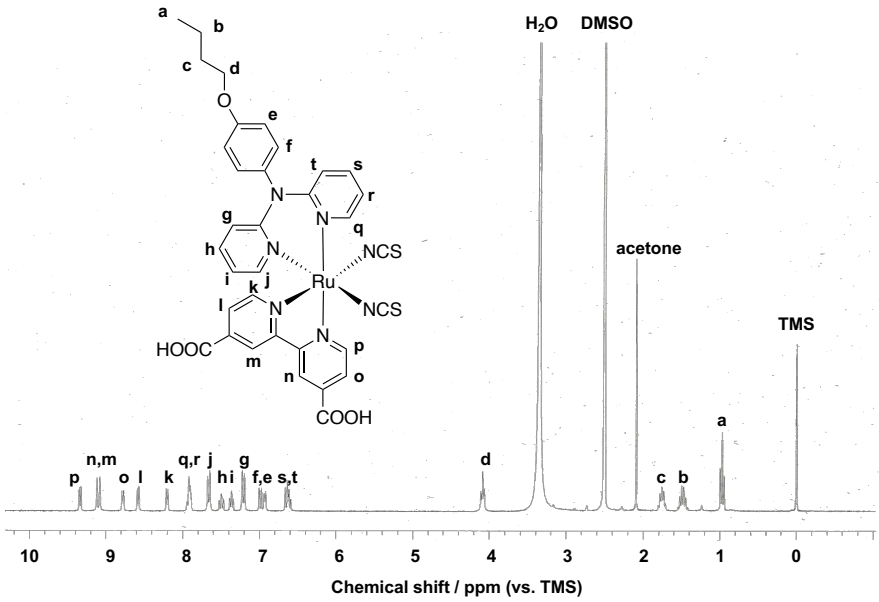


Figure S9. ^{1}H NMR spectrum of **J13** in CD_3OD.

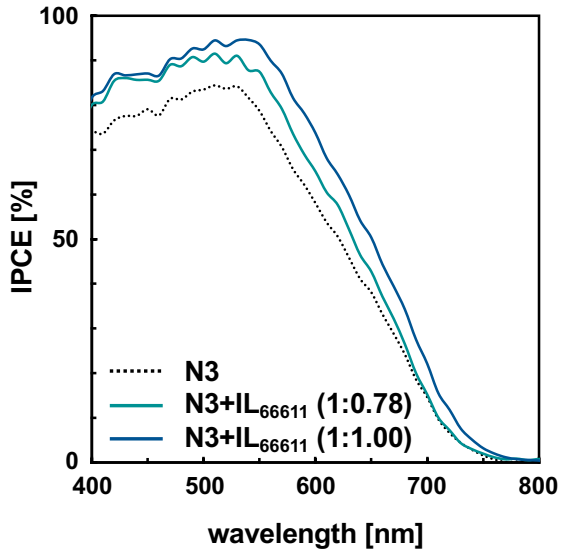
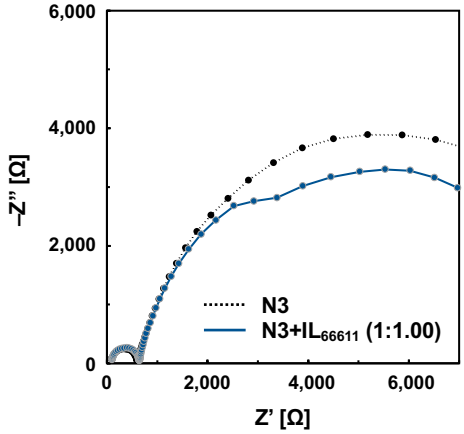
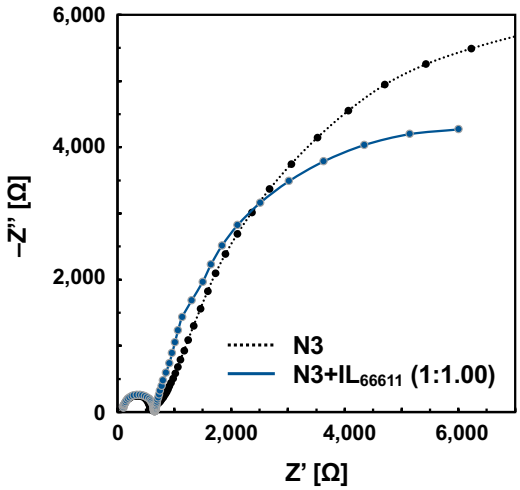


Figure S10. IPCE spectra of DSSCs based on **N3** and **N3**+**IL**$_{66612}$



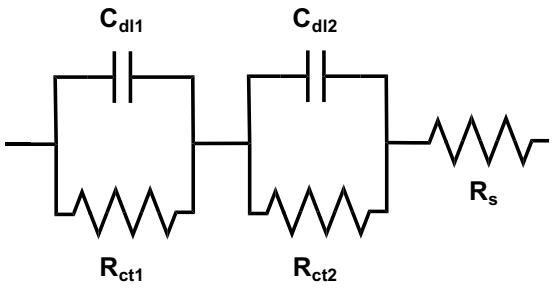
dye	Rs [kΩ]	R_{ct1}[kΩ]	C_{dl1} [μF]	R_{ct2} [kΩ]	C_{dl2} [μF]
N3	0.0887	0.541	3.86×10^{-3}	8.53	4.70
$N3+IL_{66612}$	0.0992	0.570	3.74×10^{-3}	7.76	3.26

Figure S11. EIS spectra of TiO_2 substrates modified with **N3** and **N3**+$\mathbf{IL_{66612}}$ in 0.1 M TBAP CH_3CN solution at 0.6 V and several parameters obtained by curve-fitting using the equivalent circuit shown in Figure S13.



dye	Rs [kΩ]	R_{ct1}[kΩ]	C_{dl1} [μF]	R_{ct2} [kΩ]	C_{dl2} [μF]
N3	0.0900	0.559	3.91×10^{-3}	9.41	58.1
N3+IL_{66612}	0.0960	0.569	3.70×10^{-3}	7.48	13.1

Figure S12. EIS spectra of TiO_2 substrates modified with **N3** and **N3**+$\mathbf{IL_{66612}}$ in 0.1 M TBAP CH_3CN solution at –0.6 V and several parameters obtained by curve-fitting using the equivalent circuit shown in Figure S13.



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