Supplementary Data for
Crowned Spiropyran Fluoroionophores with a Carboxyl Moiety for the Selective Detection of Lithium ions

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**Figure S1.** A) the absorbance spectra of crowned spiropyrans i) 1, ii) 2, iii) 3 after 10 min of UV black light irradiation in the presence of no ions (black), and 100x excess of lithium perchlorate (red), sodium perchlorate (green), potassium perchlorate (navy), and caesium sulphate (cyan). B) Integrated absorbance intensities (between 470 and 650 nm) of crowned spiropyrans in the presence of metal salts during photocycling with UV black light and white light 10 min each.

**Figure S2.** A) the absorbance spectra of crowned spiropyrans i) 1, ii) 2, iii) 3 after 10 min of UV black light irradiation in the presence of no ions (black), and equimolar quantities of lithium perchlorate (red), sodium perchlorate (green), potassium perchlorate (navy), and caesium sulphate (cyan).

**Figure S3.** A) the fluorescence spectra of crowned spiropyrans i) 1, ii) 2, iii) 3 after 10 min of UV black light irradiation in the presence of no ions (black), and 100x excess of lithium perchlorate (red), sodium perchlorate (green), potassium perchlorate (navy), and caesium sulphate (cyan).
Figure S4. Jobs plot of the fluorescence of SP-1 with LiClO₄ in the dark (left) and after UV₃₅₂ irradiation for 10 min (right).

**Jobs plot experimental**

Stock solutions of spiropyran SP-1 (100 μM) and LiClO₄ (100 μM) were prepared in HPLC grade acetonitrile. On the same microplate tray in triplicate the SP-1 and LiClO₄ solutions (combined total 100 μL) and acetonitrile (100 μL) were combined such that the total concentration was constant ([M] + [SP] = 50 μM) [SP]= 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, and 50 μM. The absorbance and fluorescence spectra were recorded between 300 and 700 nm, and 552 and 697 nm, respectively, at 25 °C using a BioTek Synergy H4 Hybrid Multi-Mode Microplate Reader scanning with a resolution of 5 nm. Fluorescence excitation was at 532 nm with bandgap of 9 nm.

**NMR Spectra of Spiropyrans and Intermediates**

Figure S5. 1H NMR spectrum of 5 recorded in CDCl₃ at 500 MHz
Figure S6. $^{13}$C NMR spectrum of 5 recorded in CDCl$_3$ at 126 MHz

Figure S7. $^1$H NMR spectrum of 6 recorded in d6-DMSO at 500 MHz
Figure S8. 13C NMR spectrum of 6 recorded in d6-DMSO at 126 MHz

Figure S9. 1H NMR spectrum of 11 recorded in d6-DMSO at 500 MHz
Figure S10.  $^{13}$C NMR spectrum of 11 recorded in d6-DMSO at 126 MHz
Figure S1. 1H NMR spectrum of 1 recorded in d6-DMSO at 500 MHz

Figure S12. 13C NMR spectrum of 1 recorded in d6-DMSO at 126 MHz
Figure S13. $^1$H NMR spectrum of 13 recorded in d6-DMSO at 500 MHz

Figure S14. $^{13}$C NMR spectrum of 13 recorded in d6-DMSO at 126 MHz
Figure S15. 1H NMR spectrum of 3 recorded in d6-DMSO at 500 MHz

Figure S16. 13C NMR spectrum of 3 recorded in d6-DMSO at 126 MHz