

Supporting Information's

"Green Dual-Action Potential of Newly Synthesized Sulfonamide-Based Ionic Liquids: Larvicidal Activity Against *Culex pipiens* and Purification of Oil-Polluted Water"

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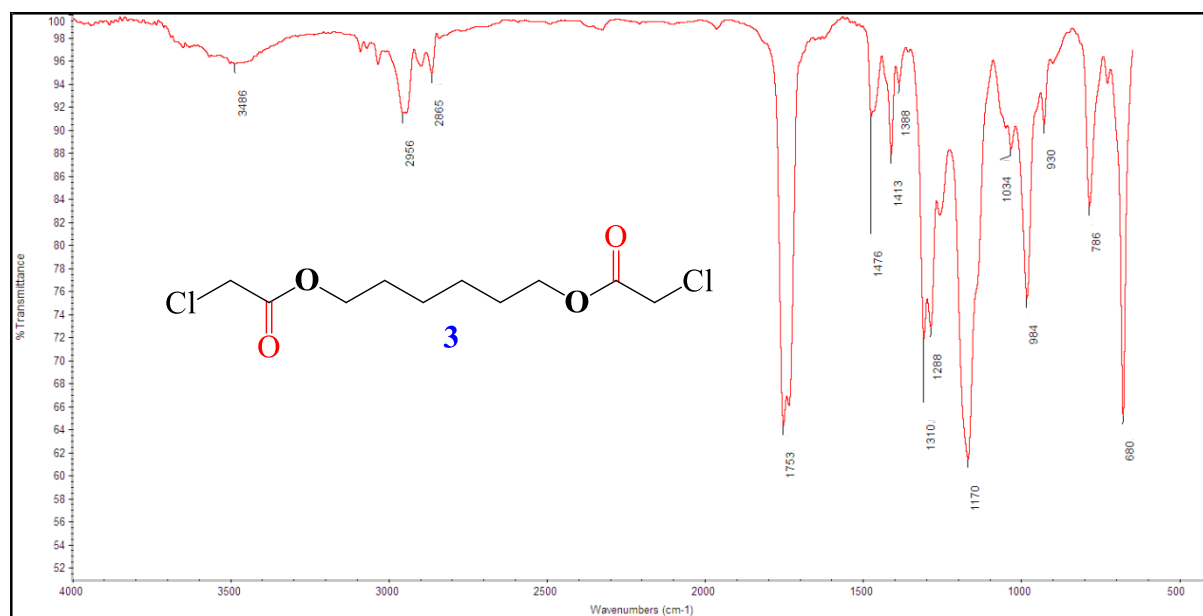
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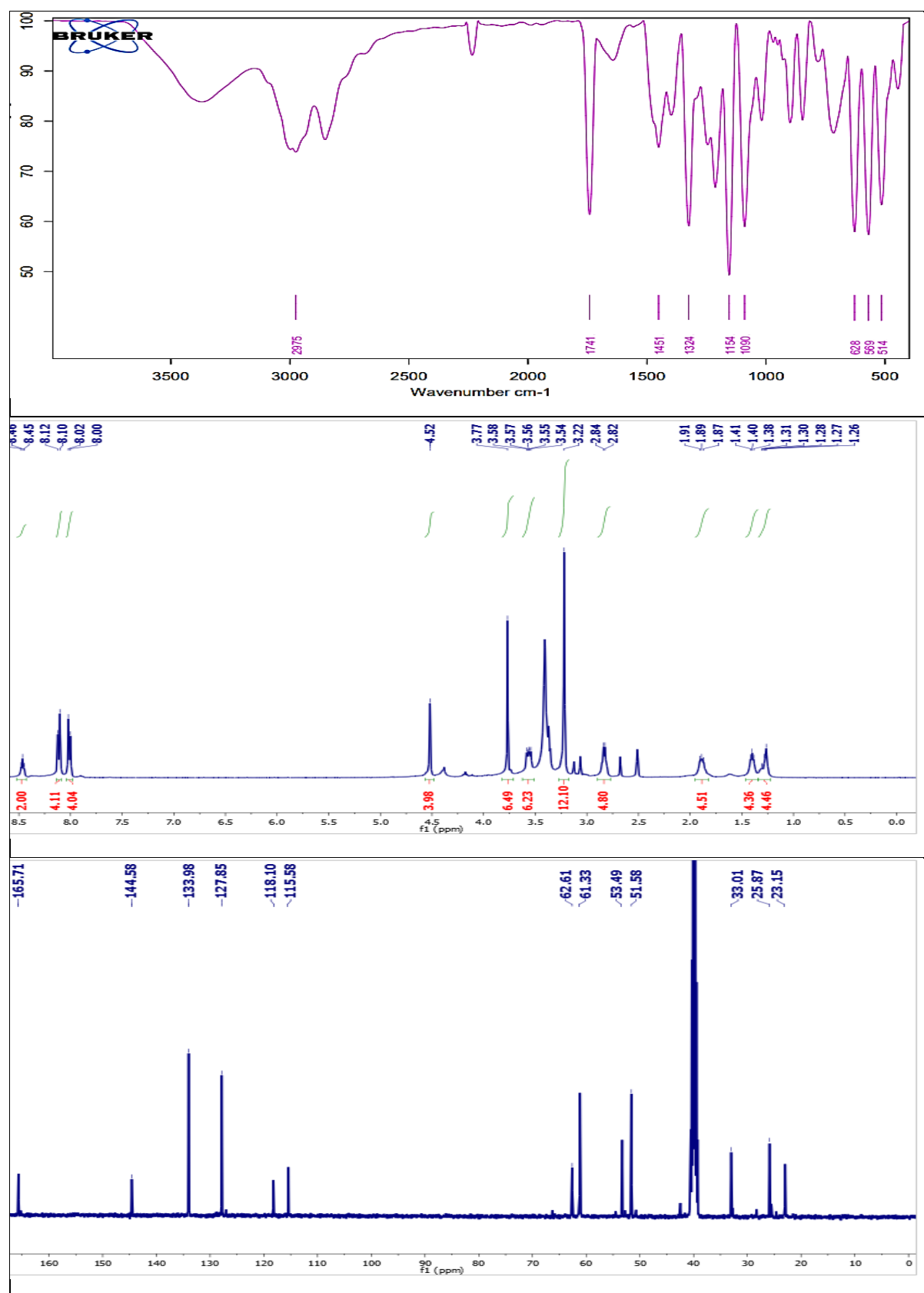
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Figure S1. IR spectrum of *Hexane-1,6-diyl bis(2-chloroacetate)* (**3**).



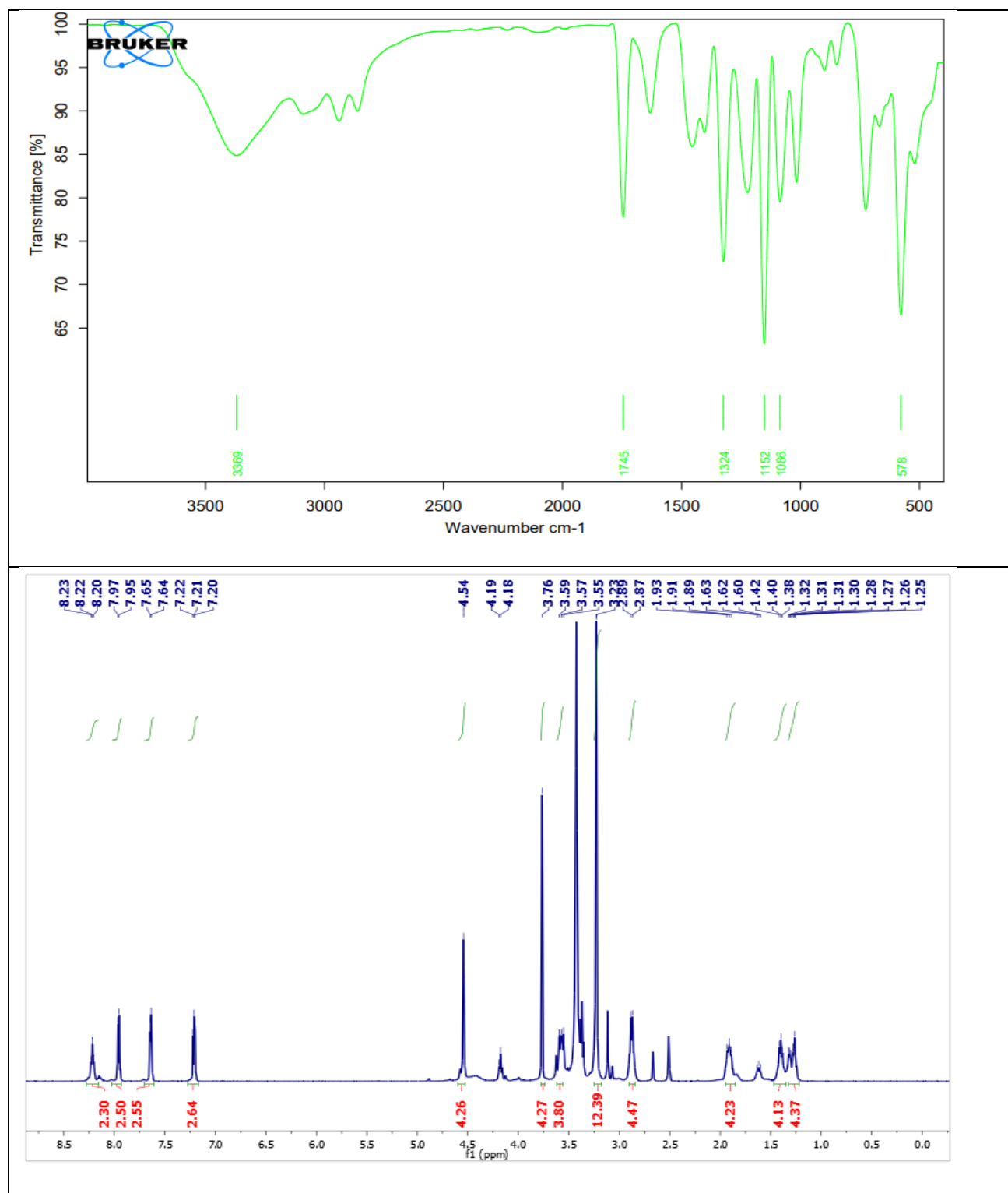
Note: All values in IR spectrum are $\pm 3\text{ cm}^{-1}$

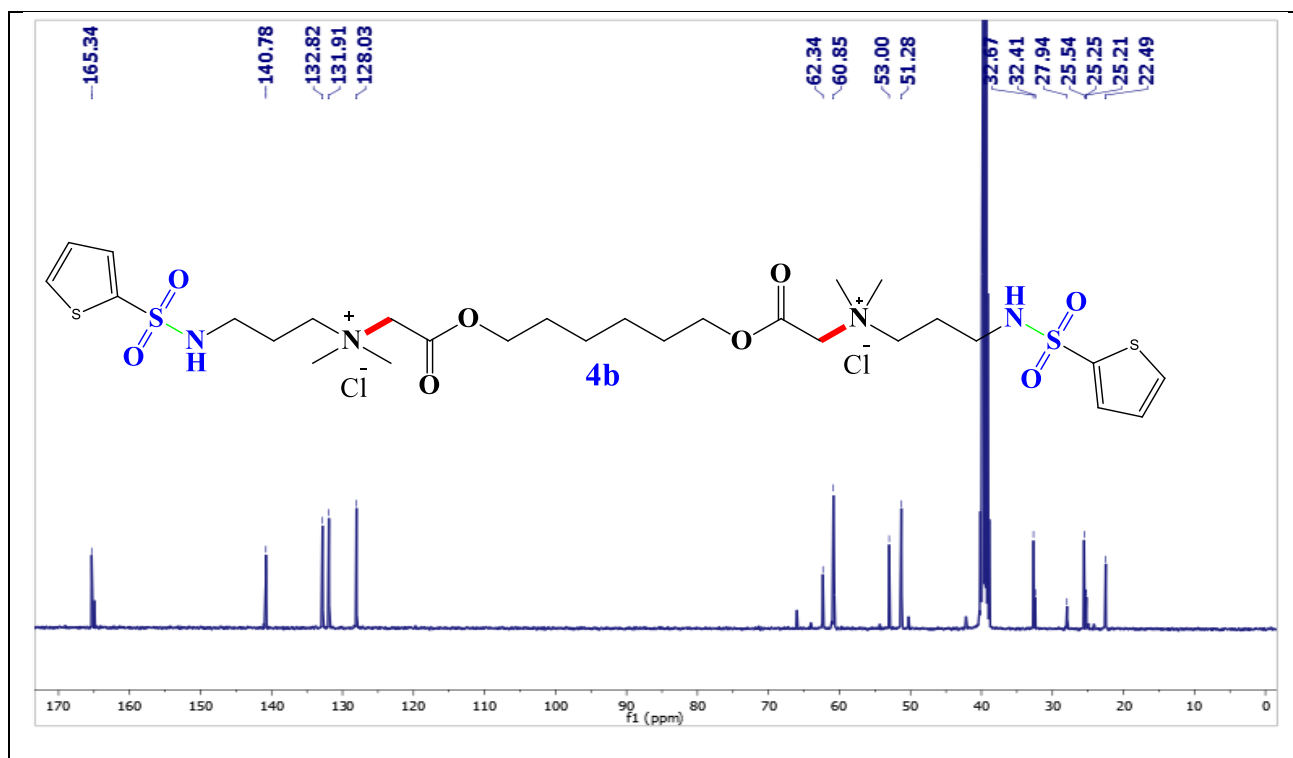
Figure S2. IR, ^1H , and ^{13}C NMR spectra of compound **4a**.



Note: All values in IR spectrum are $\pm 3 \text{ cm}^{-1}$

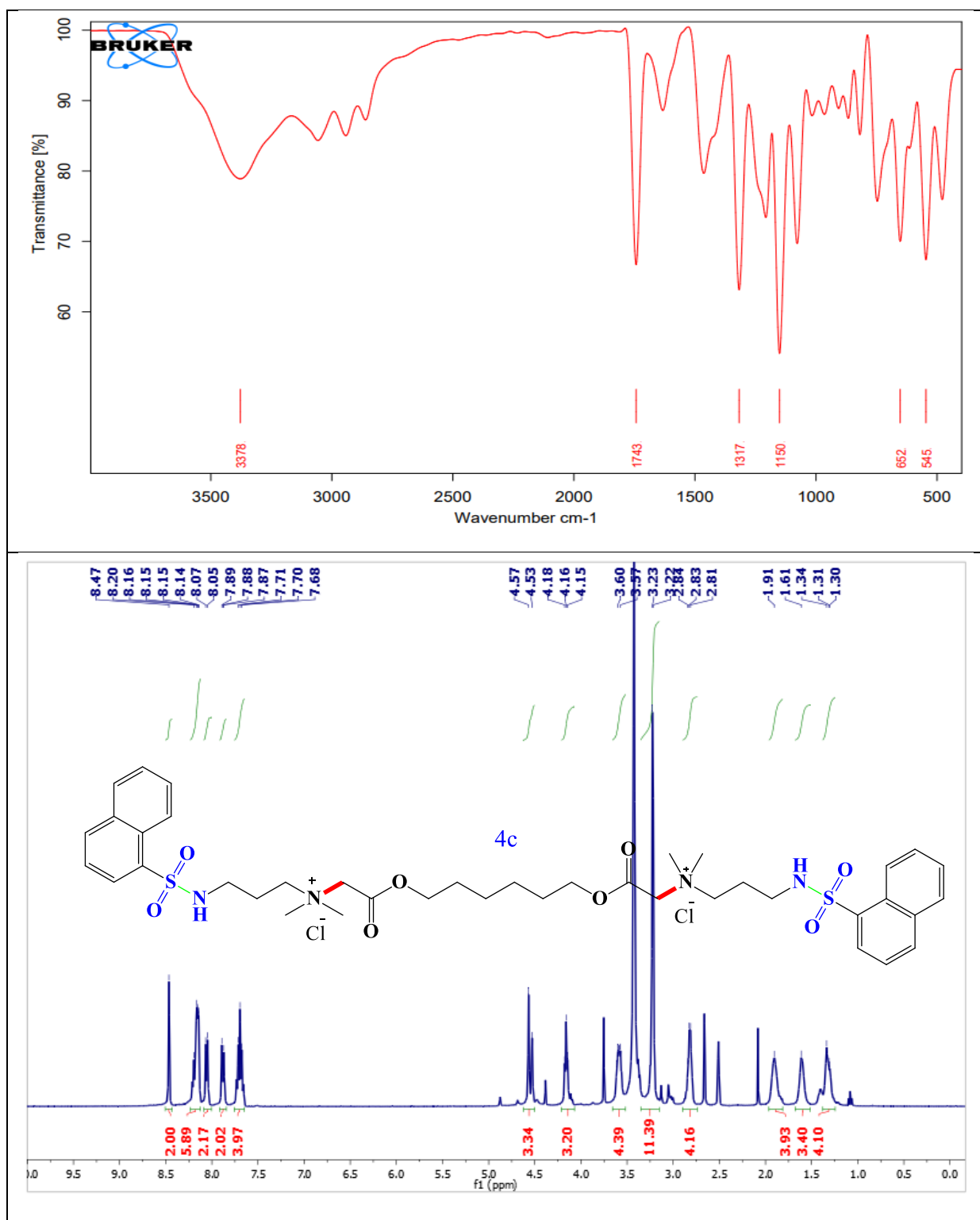
Figure S3. IR, ^1H and ^{13}C NMR spectra of *N,N'*-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(*N,N*-dimethyl-3-(thiophene-2-sulfonamido)propan-1-aminium) chloride (**4b**)

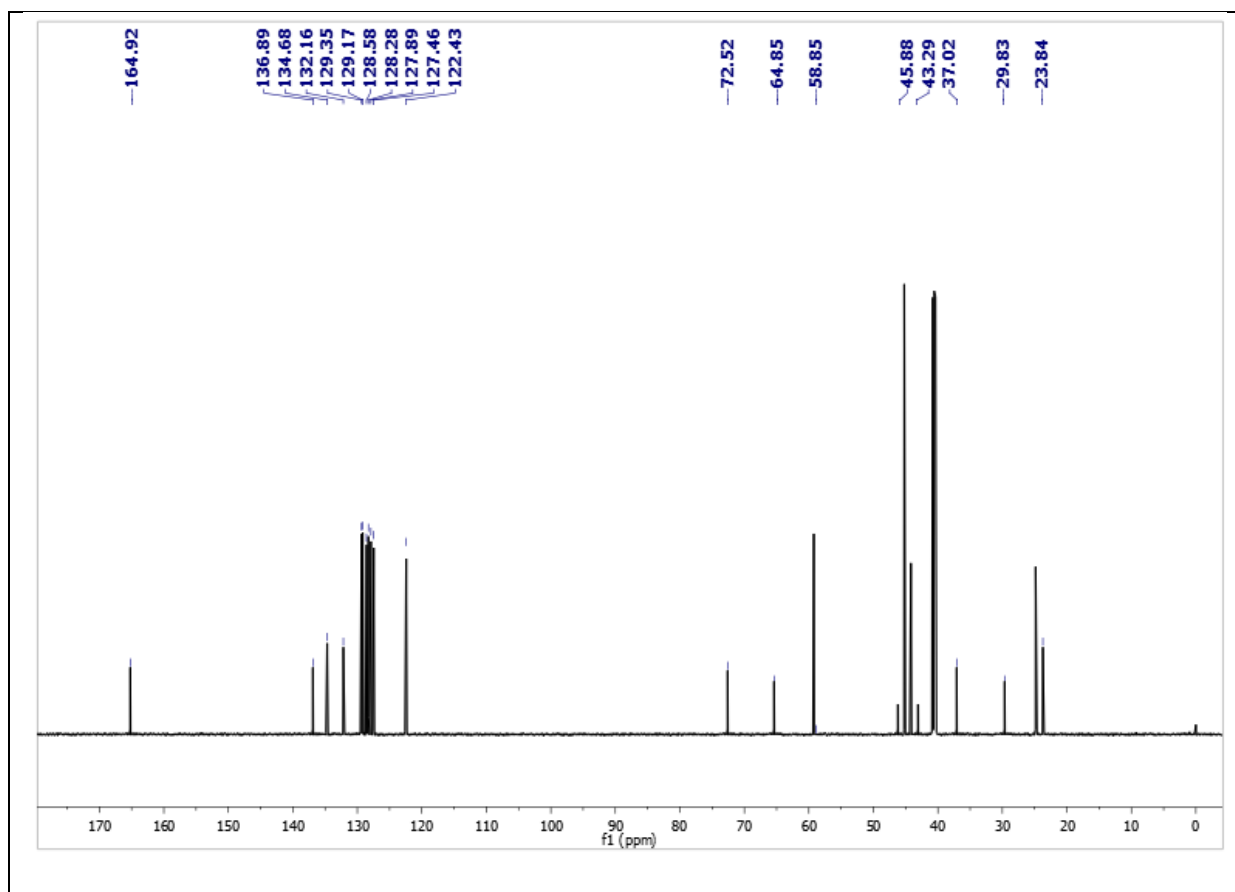




Note: All values in IR spectrum are $\pm 3\text{ cm}^{-1}$

Figure S4. IR, ^1H and ^{13}C NMR spectra of *N,N'*-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(*N,N*-dimethyl-3-(naphthalene-1-sulfonamido)propan-1-aminium) chloride (**4c**)





Note: All values in IR spectrum are $\pm 3\text{ cm}^{-1}$

Figure S5. ^1H and ^{13}C NMR spectra of *N,N'*-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(*N,N*-dimethyl-3-(2,4,6-triisopropylphenylsulfonamido)propan-1-aminium) chloride (**4d**)

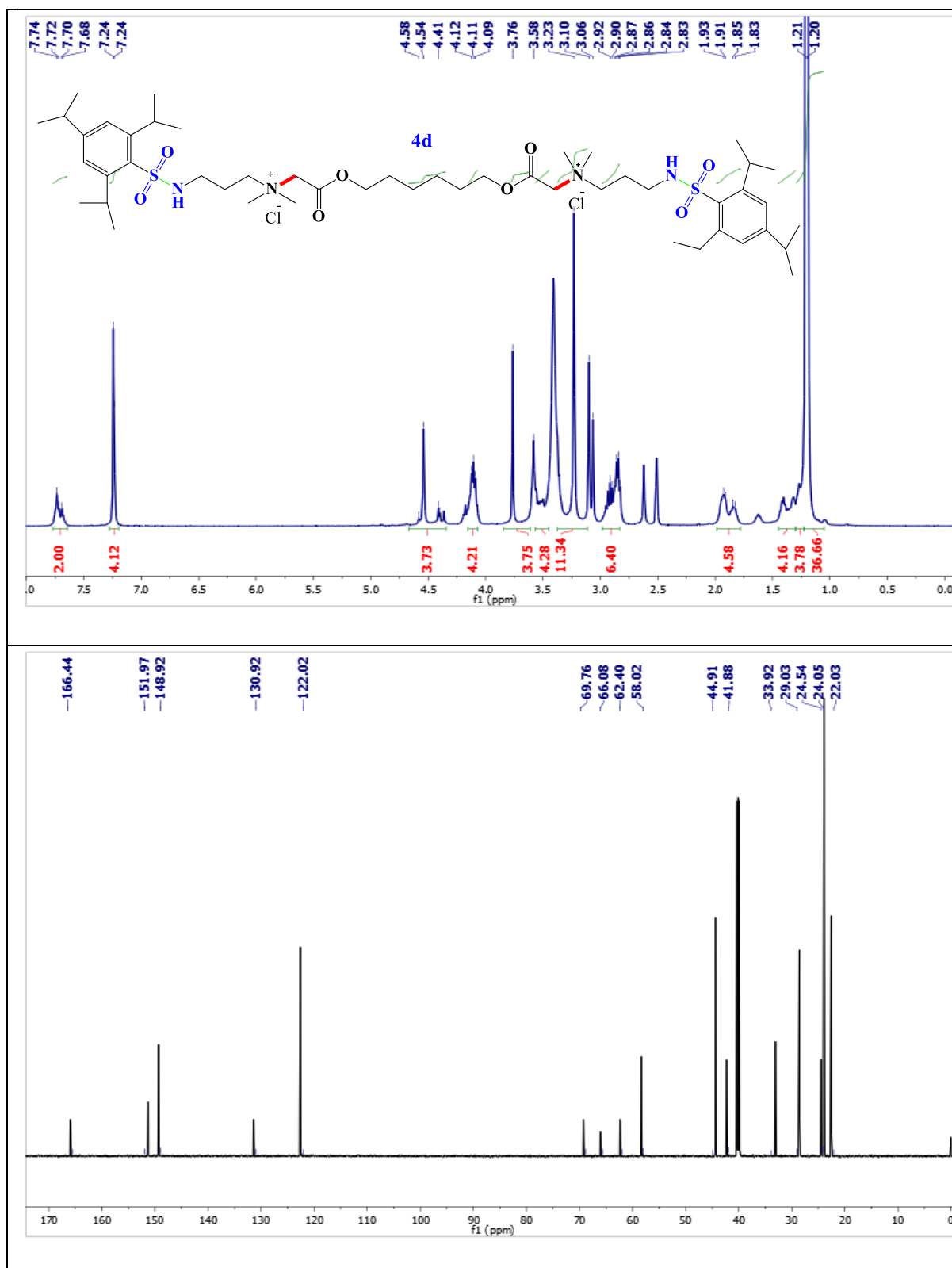


Figure S6. ^1H and ^{13}C NMR spectra of *N,N'*-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(*N,N*-dimethyl-3-(4-methylphenylsulfonamido)propan-1-aminium) chloride (**4e**)

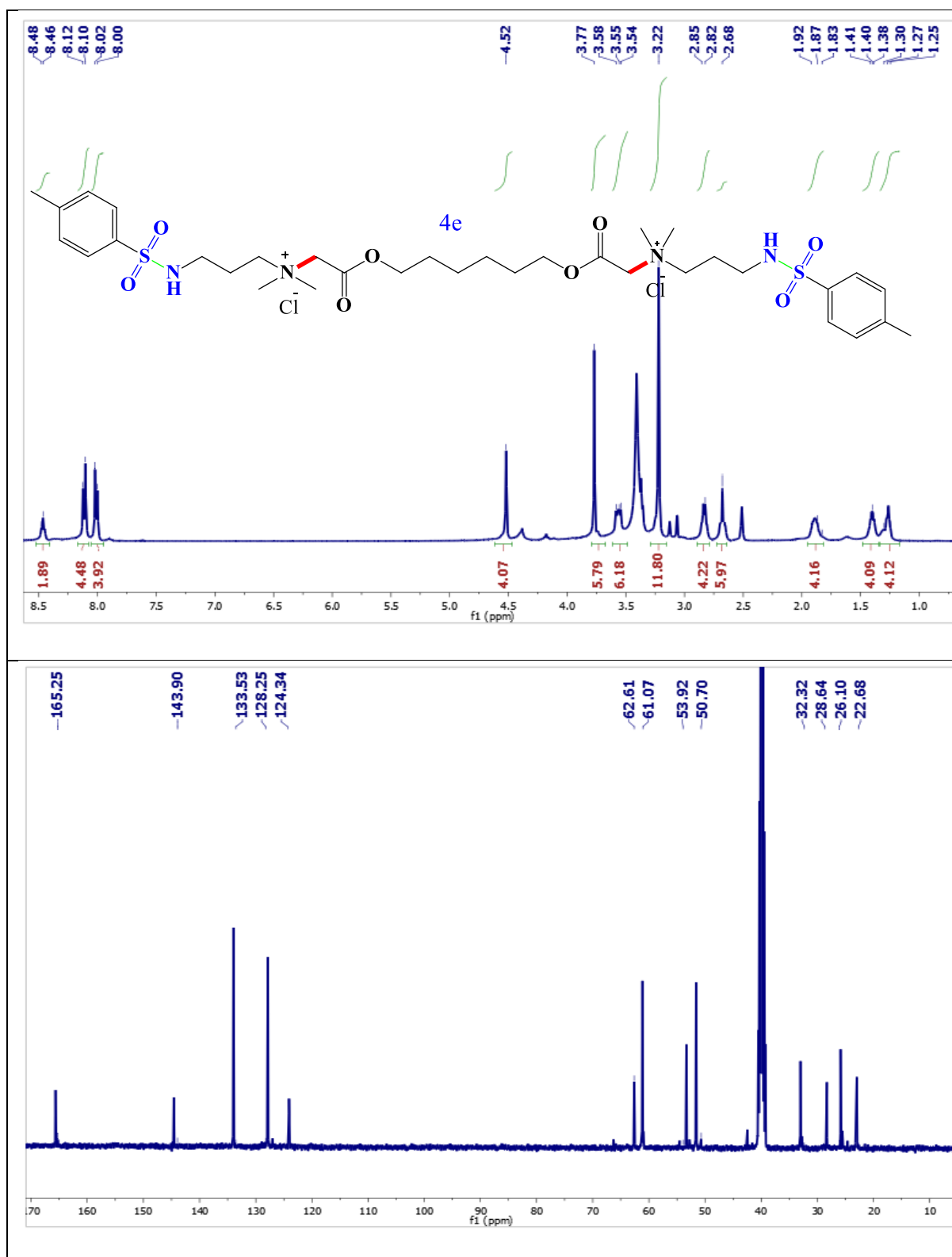
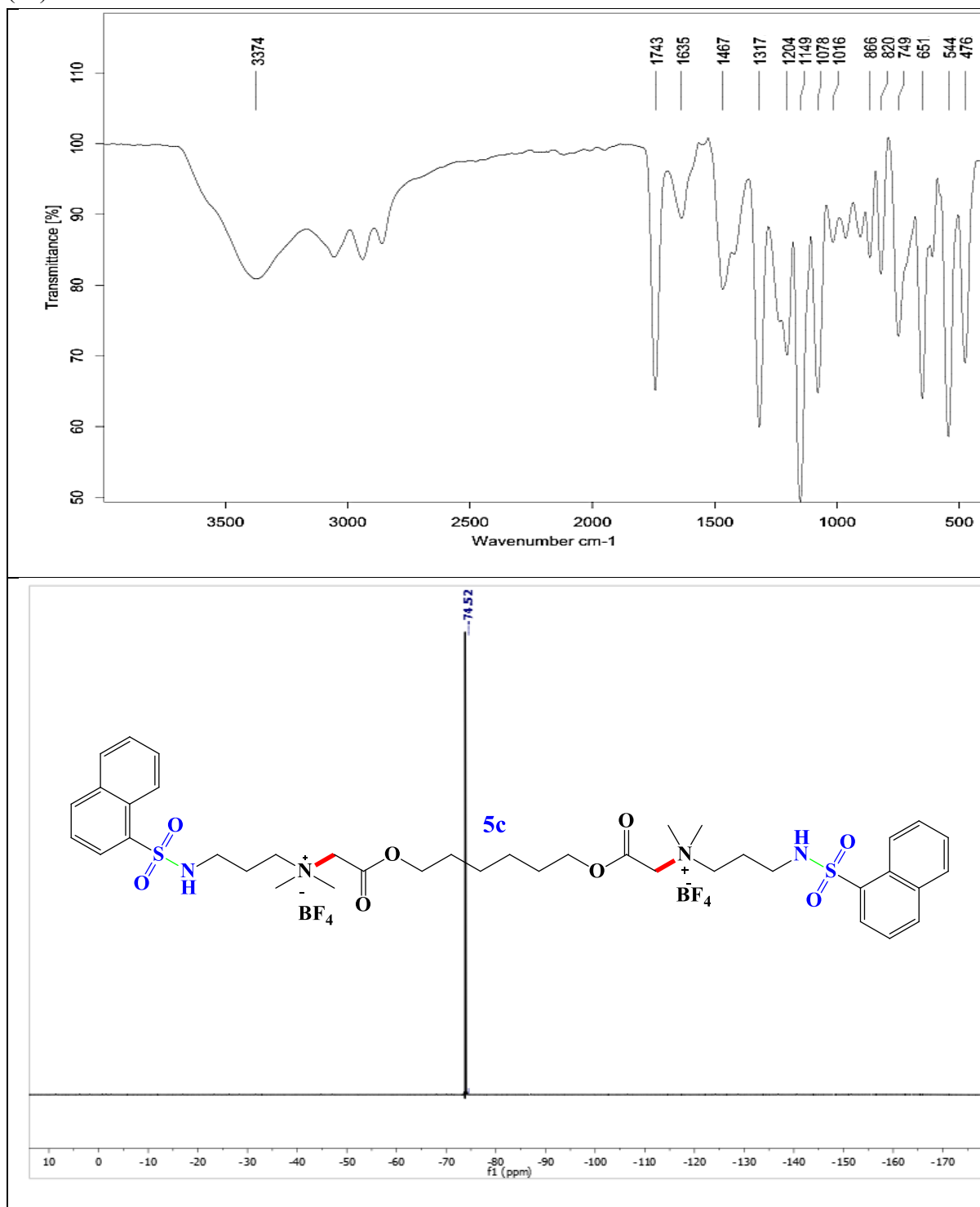
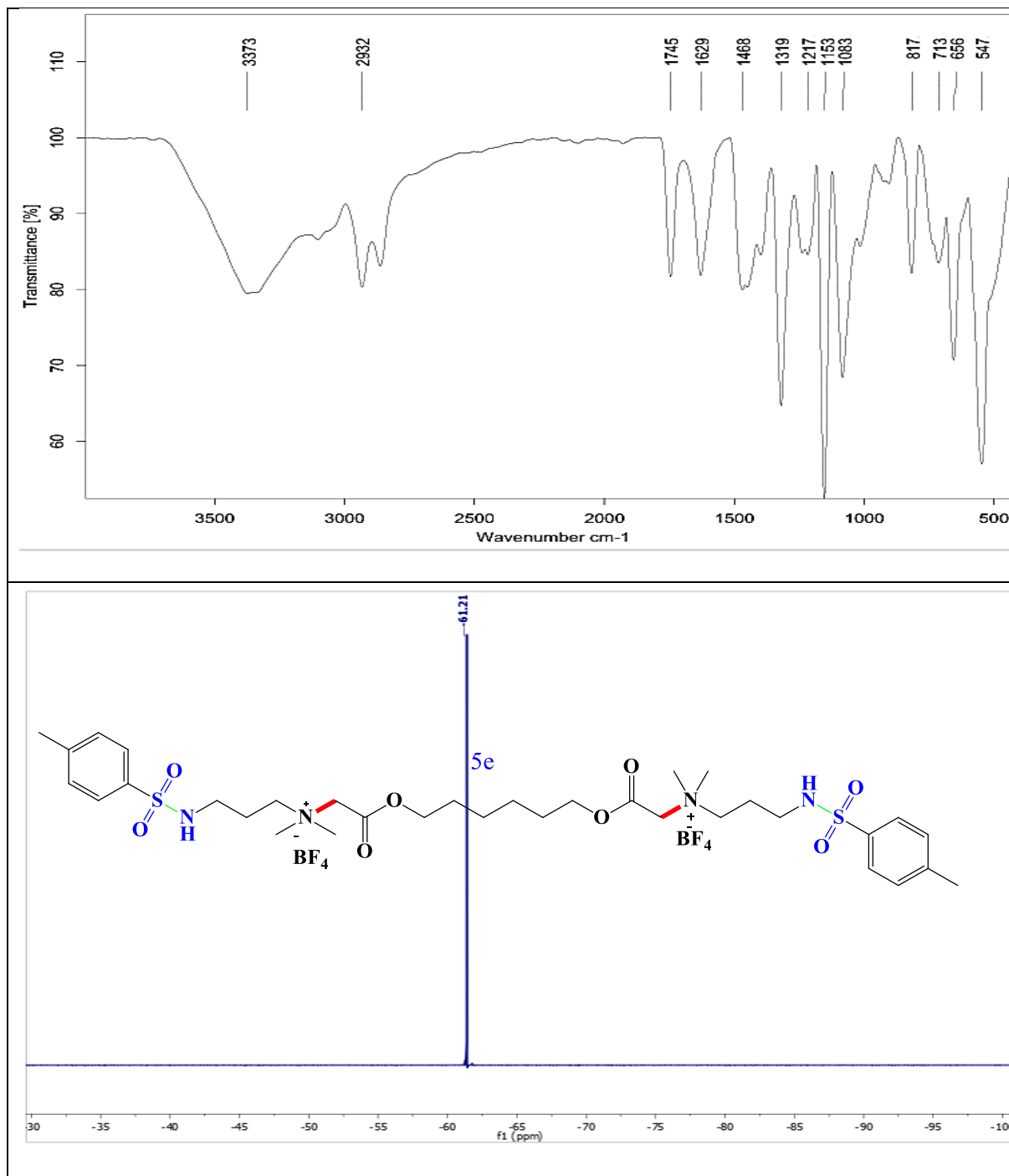


Figure S7. IR and ^{15}F NMR spectra of *N,N'*-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(*N,N*-dimethyl-3-(naphthalene-1-sulfonamido)propan-1-aminium) tetrafluoroborate (**5c**).



Note: All values in IR spectrum are $\pm 3 \text{ cm}^{-1}$

Figure S8. IR and ^{15}F NMR spectra of *N,N'*-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(*N,N*-dimethyl-3-(4-methylphenylsulfonamido)propan-1-aminium) tetrafluoroborate (**5e**)



Note: All values in IR spectrum are $\pm 3 \text{ cm}^{-1}$

Figure S9. Mortality percentages of the early third larval instar of *Culex pipiens* after exposure to temephos, 48 h post-treatment.

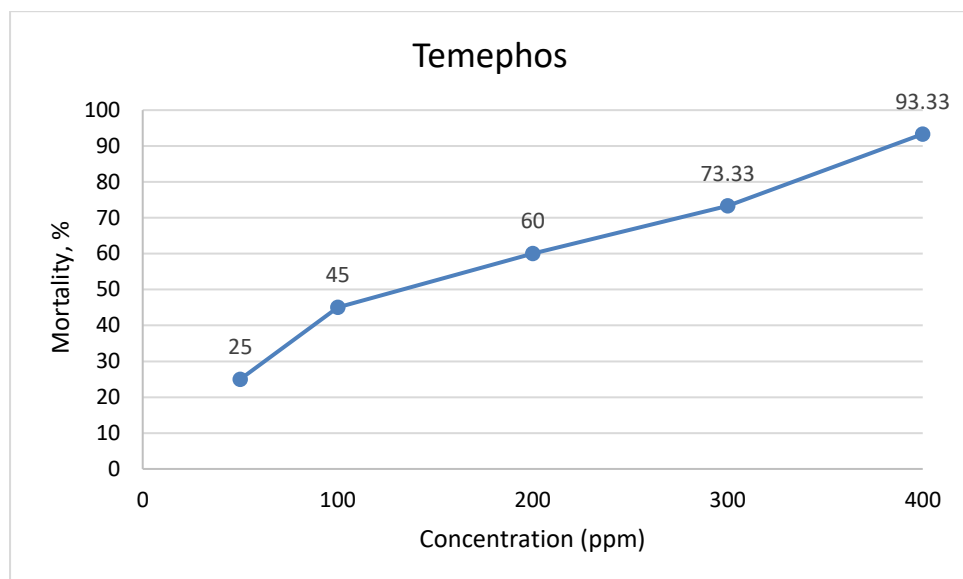
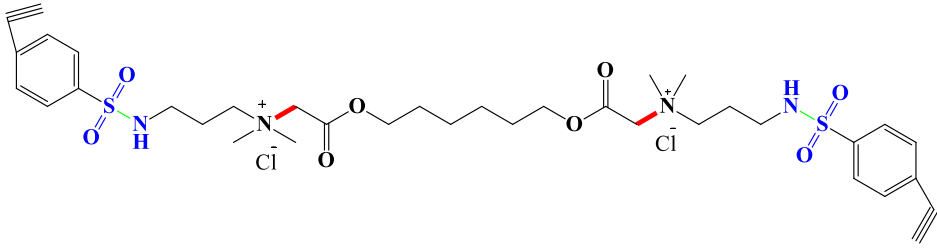
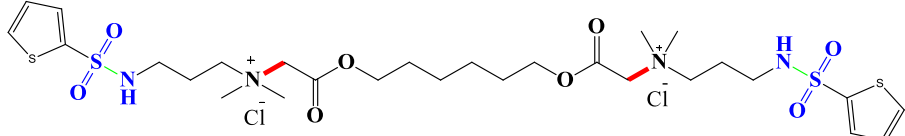
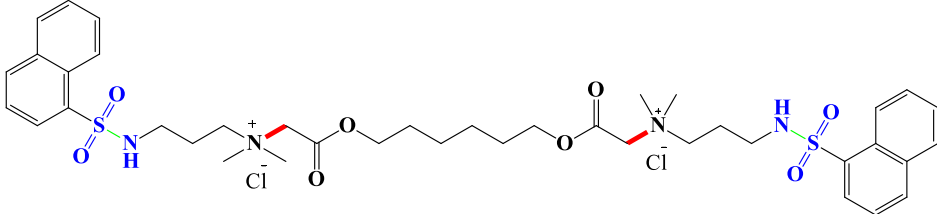
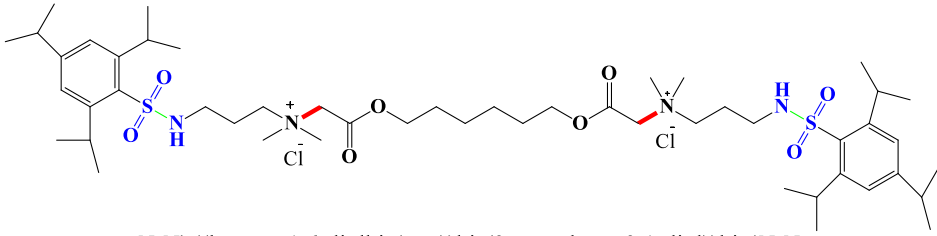
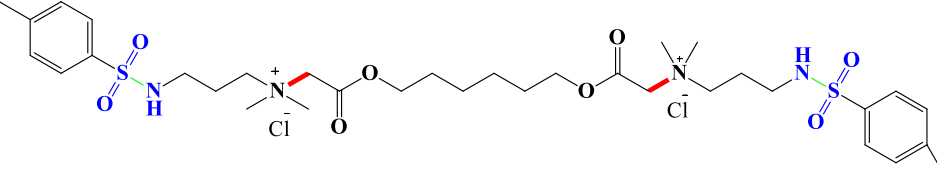


Table S1. Abbreviations and chemical compositions of **4a-e**, **5c**, and **5e**

4a	 <i>N,N'</i>-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(3-(4-ethynylphenylsulfonamido)-<i>N,N</i>-dimethylpropan-1-aminium) chloride
4b	 <i>N,N'</i>-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(<i>N,N</i>-dimethyl-3-(thiophene-2-sulfonamido)propan-1-aminium) chloride
4c	 <i>N,N'</i>-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(<i>N,N</i>-dimethyl-3-(naphthalene-1-sulfonamido)propan-1-aminium) chloride
4d	 <i>N,N'</i>-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(<i>N,N</i>-dimethyl-3-(2,4,6-triisopropylphenylsulfonamido)propan-1-aminium) chloride
4e	 <i>N,N'</i>-((hexane-1,6-diylbis(oxy))bis(2-oxoethane-2,1-diyl))bis(<i>N,N</i>-dimethyl-3-(4-methylphenylsulfonamido)propan-1-aminium) chloride

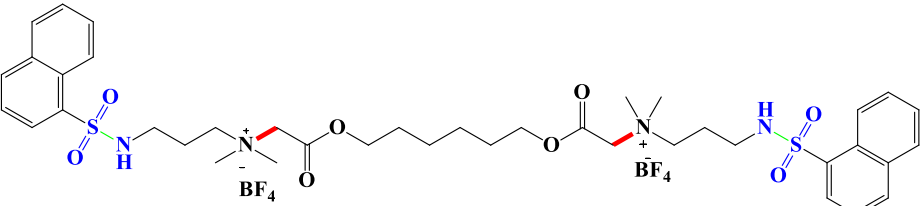
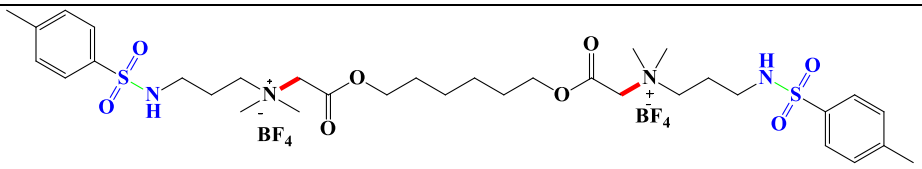
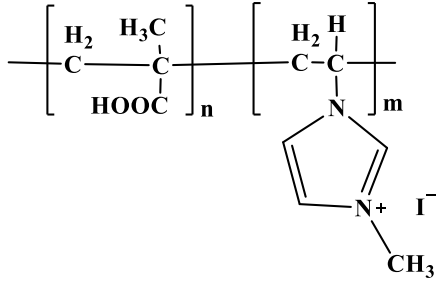
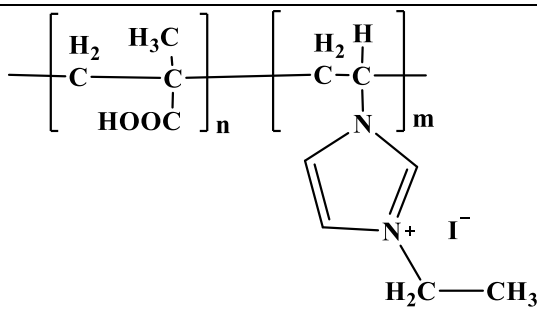
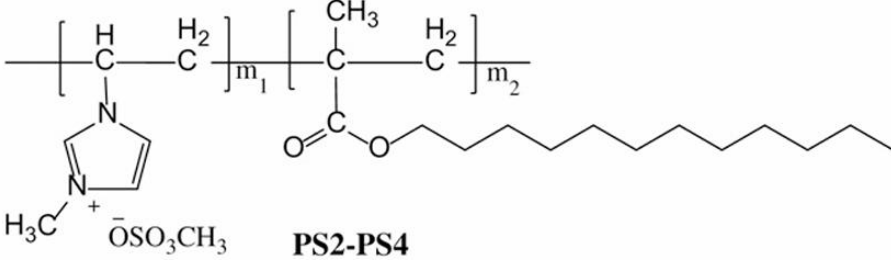
5c	 <i>N,N'</i>-((hexane-1,6-diylbis(oxo))bis(2-oxoethane-2,1-diyl))bis(<i>N,N</i>-dimethyl-3-(naphthalene-1-sulfonamido)propan-1-aminium) tetrafluoroborate
5e	 <i>N,N'</i>-((hexane-1,6-diylbis(oxo))bis(2-oxoethane-2,1-diyl))bis(<i>N,N</i>-dimethyl-3-(4-methylphenylsulfonamido)propan-1-aminium) tetrafluoroborate

Table S2. Some Abbreviations for previous reported work [52-54]

<i>Abbreviation</i>	<i>Structure</i>
AISM	
AISE	
PS2 and PS3	 PS2-PS4