

### Supplementary Information

#### Nuclear Magnetic Resonance Enables Understanding of PolyDiallyldimethyl Ammonium Chloride

#### Composition and N-Nitrosodimethylamine Formation During Chloramination

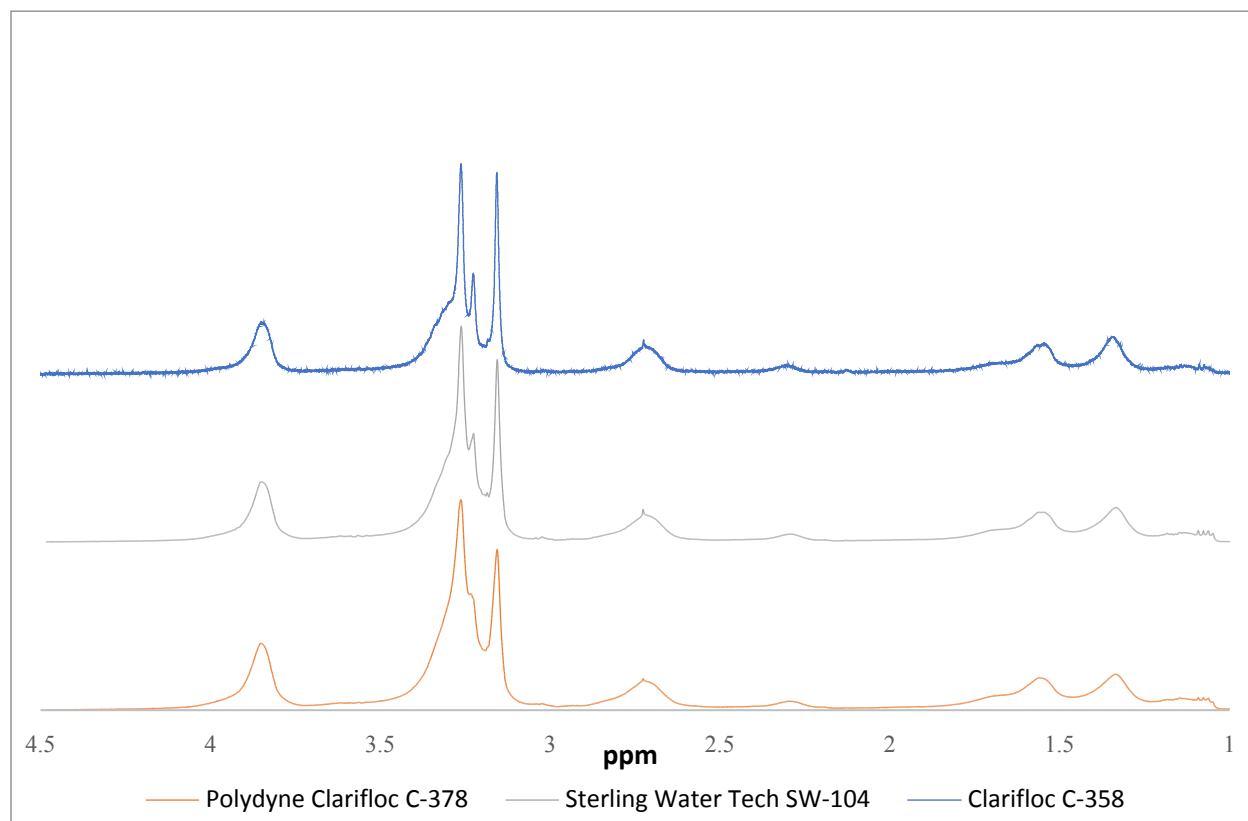
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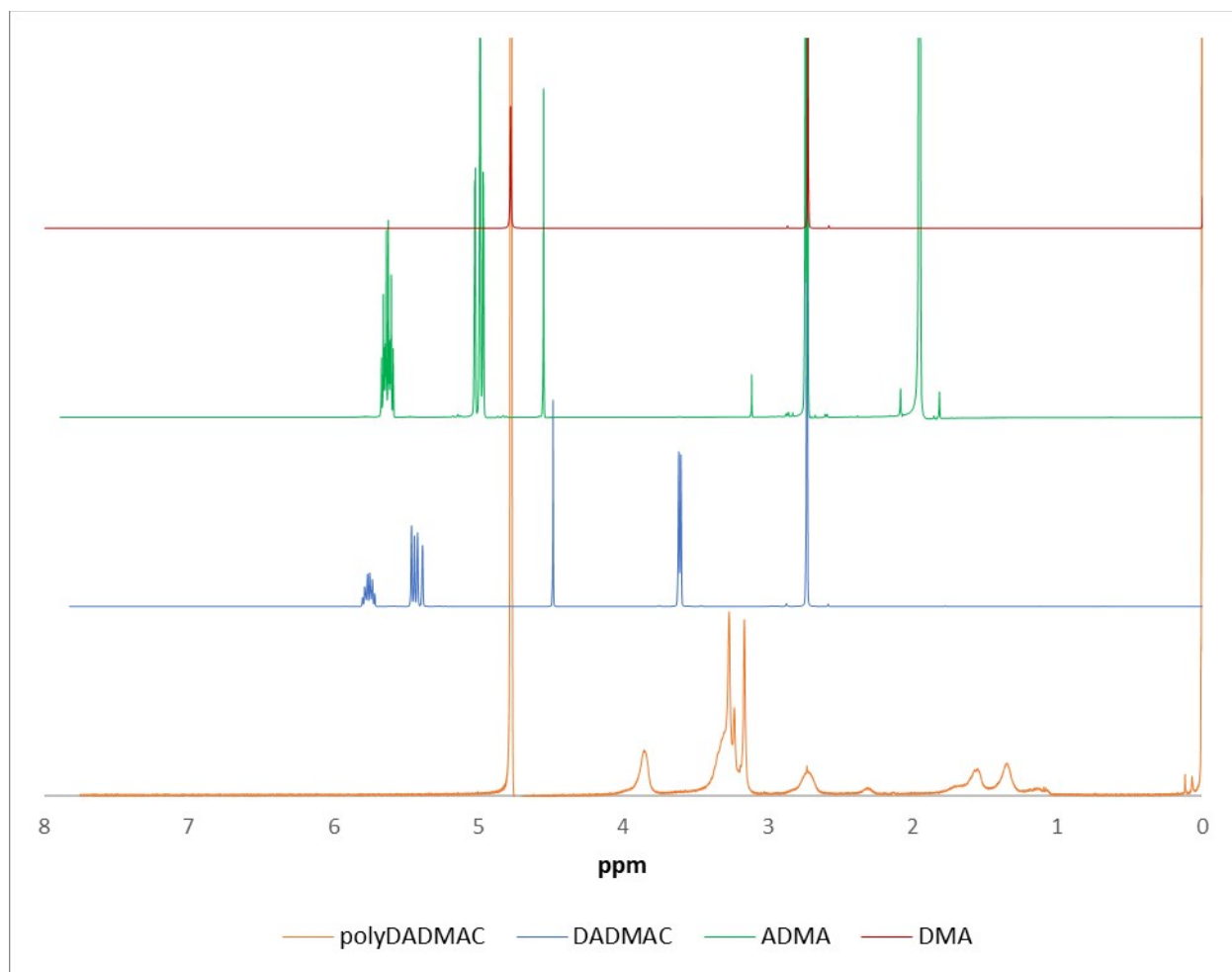
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Figure S1 shows the  $^1\text{H}$ -NMR spectra of three additional commercially available polyDADMAC solutions. The commercial polymer solutions were characterized via  $^1\text{H}$ -NMR, confirming that they have the same general structure, and smaller oligomers can also be seen.



**Figure S11:**  $^1\text{H}$ -NMR spectra of three commercial polyDADMAC solutions.

Figure S12 shows the reference  $^1\text{H}$ -NMR spectra for these impurity and precursor low molecular weight compounds. The spectra reveal that the peaks at 2.73 ppm correspond to DMA while the peaks at 1-1.20 ppm are indicative of oligomers. ADMA and DADMAC were not readily observed in the spectra.



**Figure SI 2:** <sup>1</sup>H-NMR spectra of a commercial polyDADMAC solution, DADMAC, ADMA, and DMA.