Exploring the use of APTS as a fluorescent reporter dye for continuous glucose sensing†

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† Dedicated to Professor Seiji Shinkai on the occasion of his 65th birthday.

Supporting information included:

- Fluorescence profile with varying pH for MABP with APTS and HPTS
- Excitation and emission spectra of APTS and polymerizable derivatives.
- Stability of hydrogels 4 and 5.
- NMR spectra of APTS, APTS-BUMA, and APTS-DEGMA

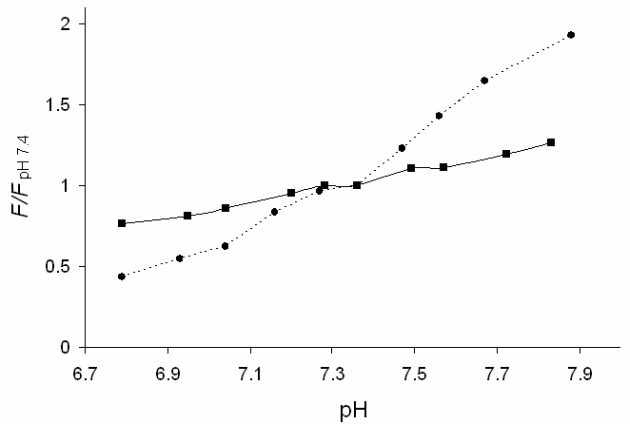

Fig. S1 Relative intensity versus pH for MABP:APTS (■) and MABP:HPTS (●) (10:1 ratio) in the presence of 10 mM glucose. Dye concentration is 4×10^{-6} M. The fluorescence is normalized relative to intensity at pH 7.4.

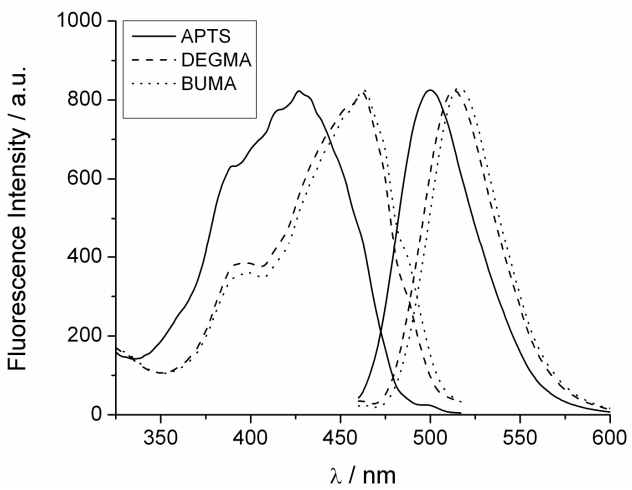

Fig. S2 Excitation (a) and emission (b) spectra of APTS (λ_{ex} = 428 nm, λ_{em} = 500 nm), APTS-BuMA (λ_{ex} = 463 nm, λ_{em} = 516 nm), and APTS-DEGMA (λ_{ex} = 462 nm, λ_{em} = 513 nm) in 4×10^{-6} M in pH 7.4 phosphate buffer.

Figure S3 shows the fluorescence intensity of hydrogel 4 containing the dye APTS-BuMA, monitored at 507 nm(λ_{ex}=464 nm)., and Figure S4 shows the fluorescence intensity of hydrogel 5 containing APTS-DEGMA, monitored at 503 nm(λ_{ex}=463 nm). To verify that the fluorescent dyes remained immobilized within the HEMA hydrogel matrices, they were monitored for up to 24 hours while exposed to a constant circulation of pH 7.4 phosphate buffer heated at 60 ^{o}C. They were subjected to this high temperature in order to challenge the gels at extremes to see if the dye would leach out. Both gels were quite stable under these conditions. These results verify that the two polymerizable dye analogs are incorporated into the gel and retain their fluorescence properties.

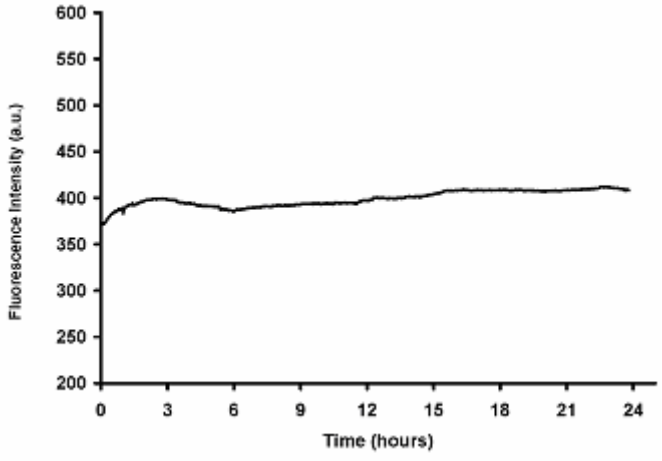

Fig. S3 Stability of APTS-BuMA dye only Hydrogel **4** (λ_{ex} = 464 nm, λ_{em} = 507 nm)

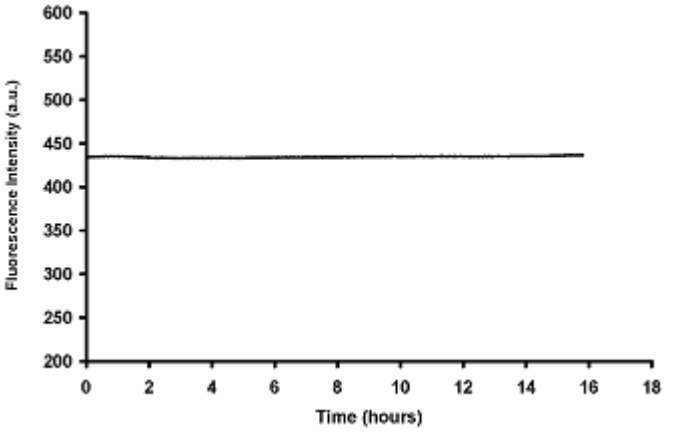

Fig. S4 Stability of APTS-DEGMA dye only Hydrogel **5** (λ_{ex} = 463 nm, λ_{em} = 503 nm)

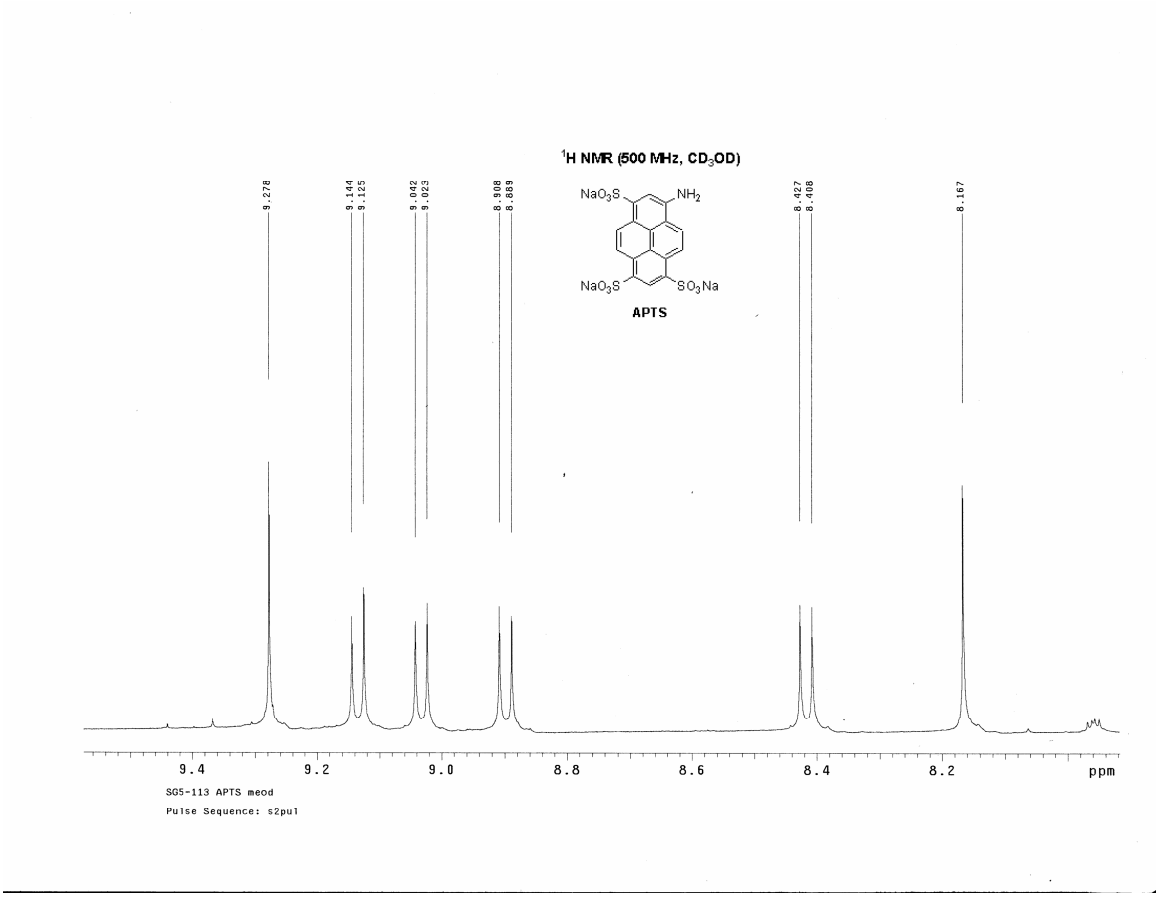

Fig. S5 ^{1}H-NMR spectrum of APTS in CD_3OD

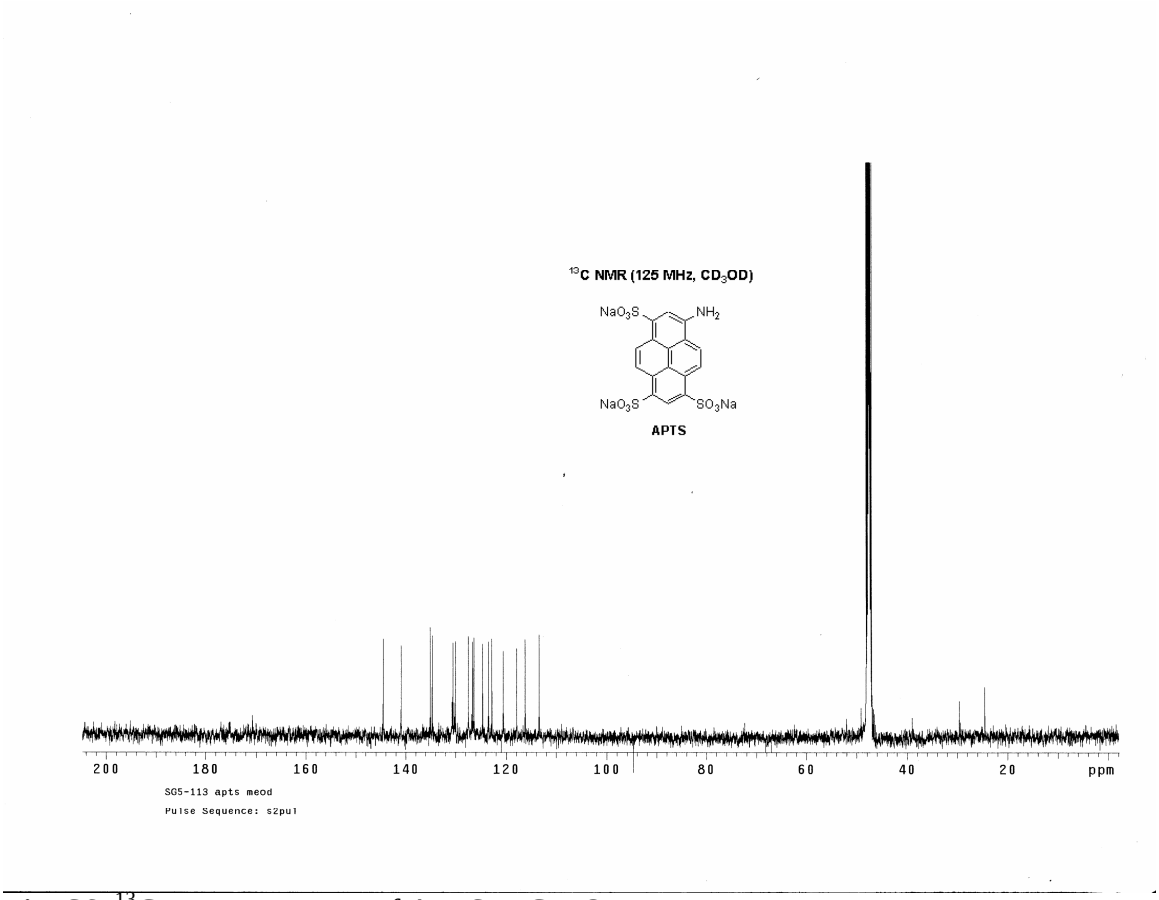

Fig. S6 ^{13}C-NMR spectrum of APTS in CD_3OD

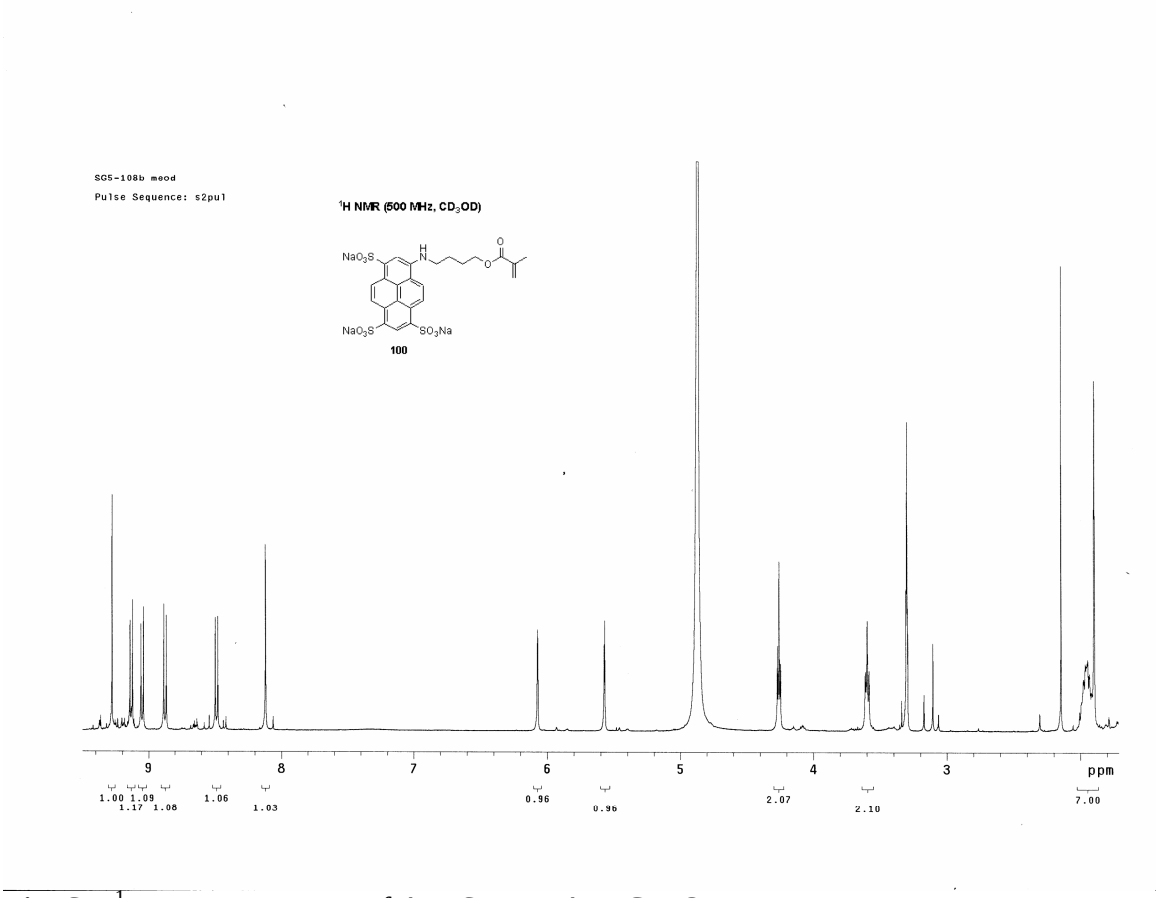

Fig. S7 ^{1}H-NMR spectrum of APTS-BUMA in CD_3OD

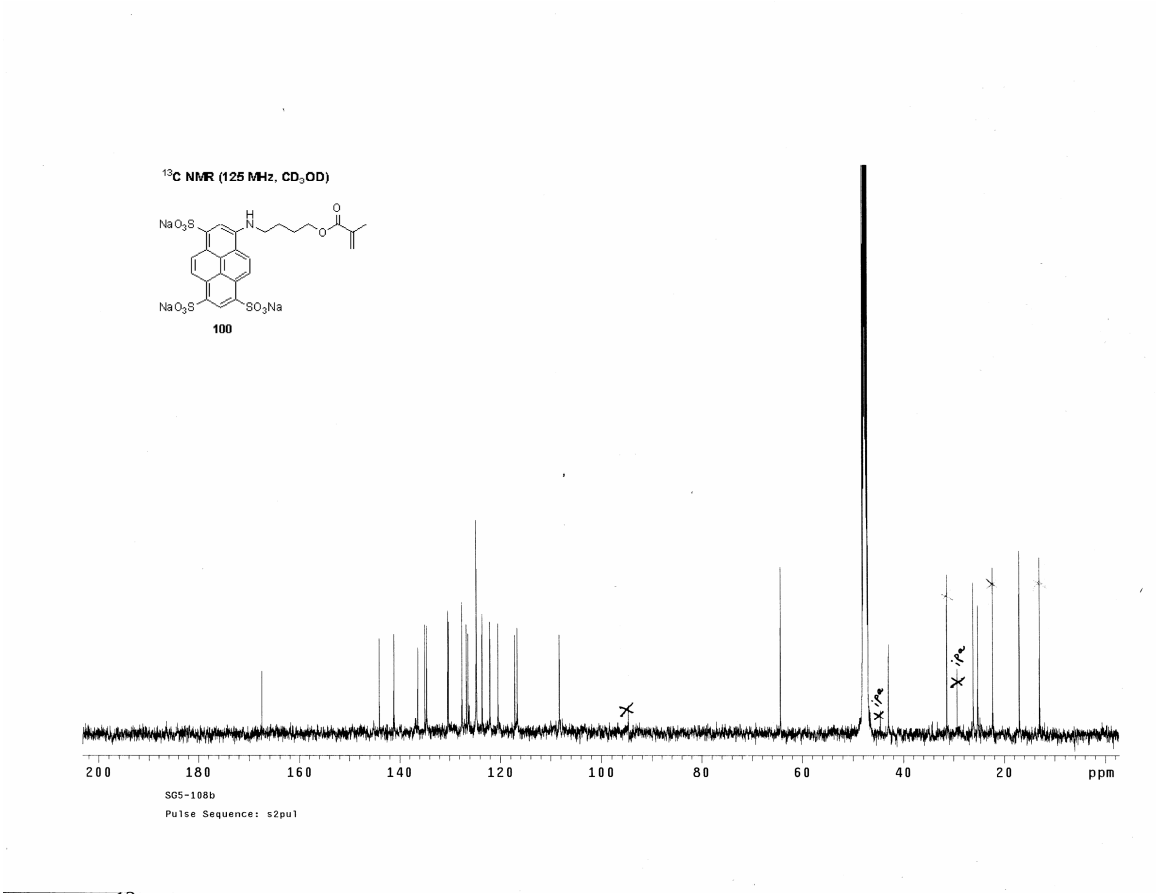

Fig. S8 ^{13}C-NMR spectrum of APTS-BUMA in CD_3OD

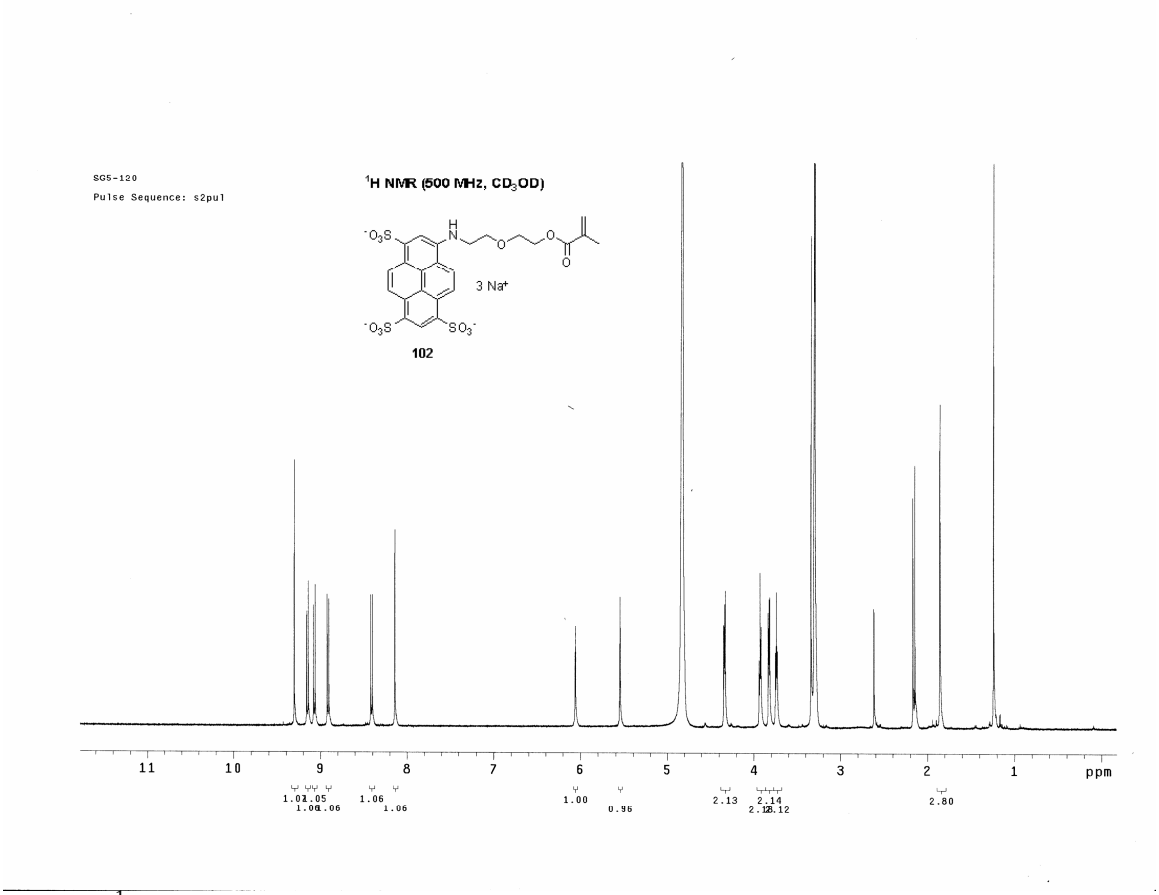

Fig. S9 ^{1}H-NMR spectrum of APTS-DEGMA in CD_3OD

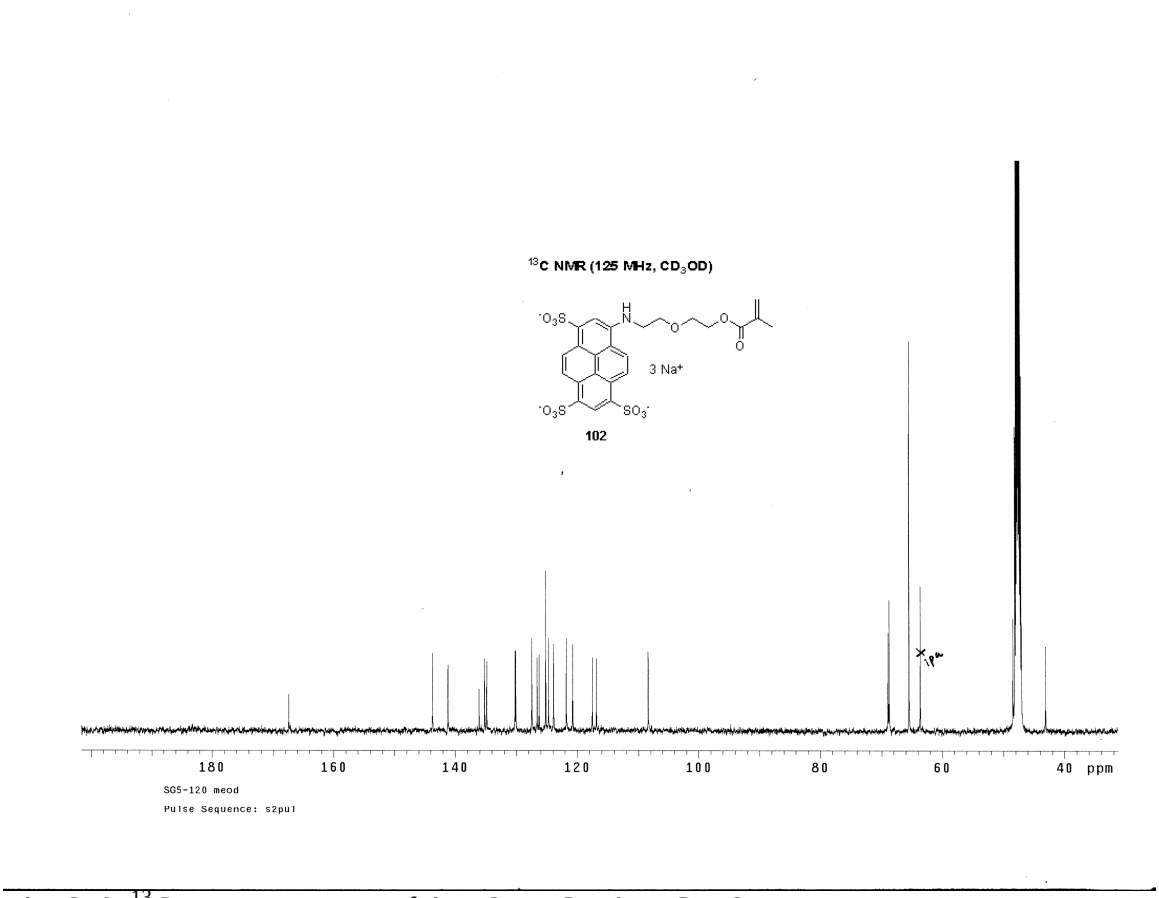

Fig. S10 ^{13}C-NMR spectrum of APTS-DEGMA in CD_3OD