Supplementary information

Exploring 1,3-dioxolane polymerization initiated by $NOPF_6$: a universal approach to self-solidifying electrolytes for high-capacity retention potassium batteries

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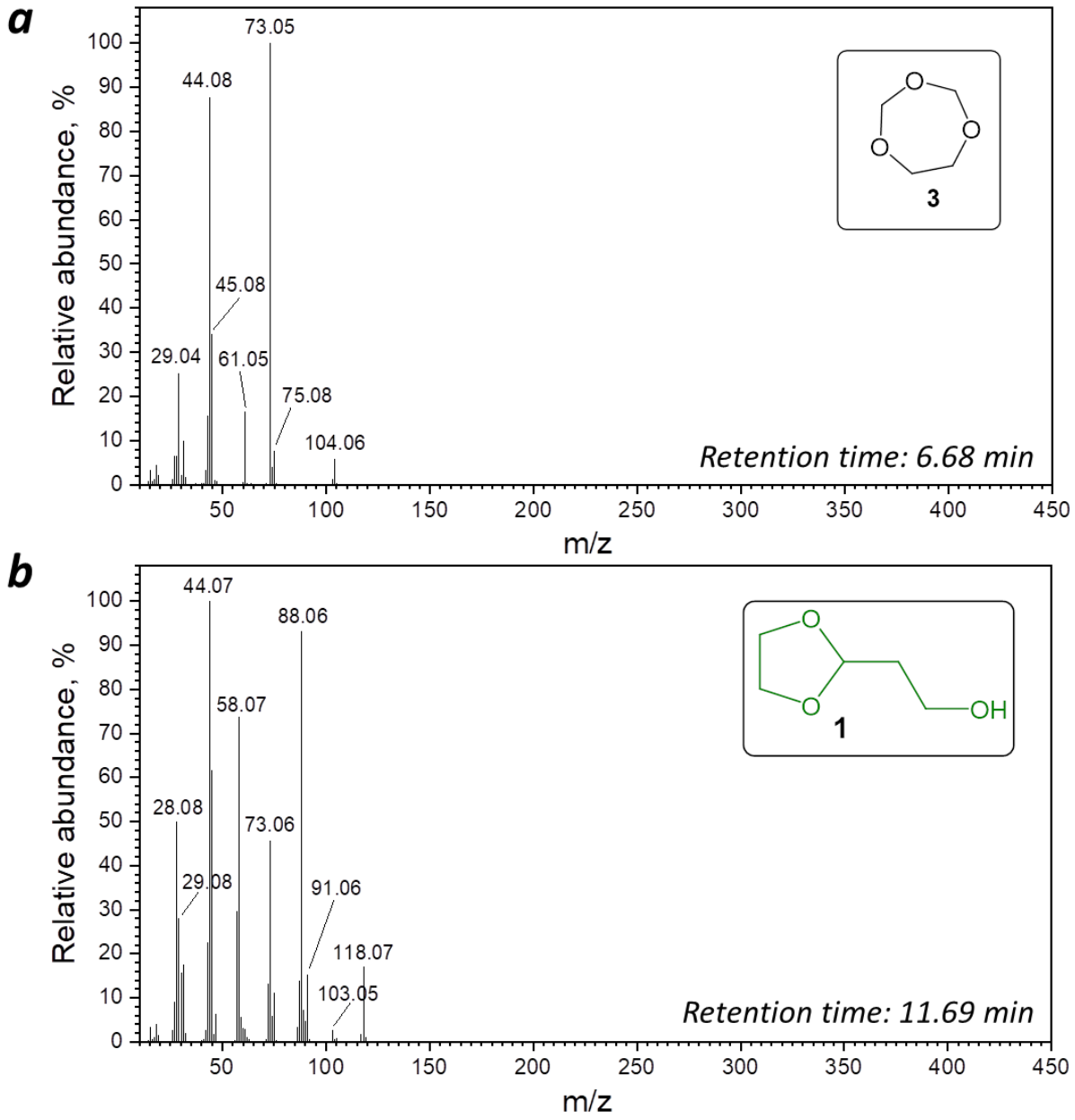

Figure S1. Mass spectra of the products formed 5 minutes after the addition of $NOPF_6$ to 1M KFSI in DOL/DME: a) GC retention time 6.68 min; b) GC retention time 11.69 min.

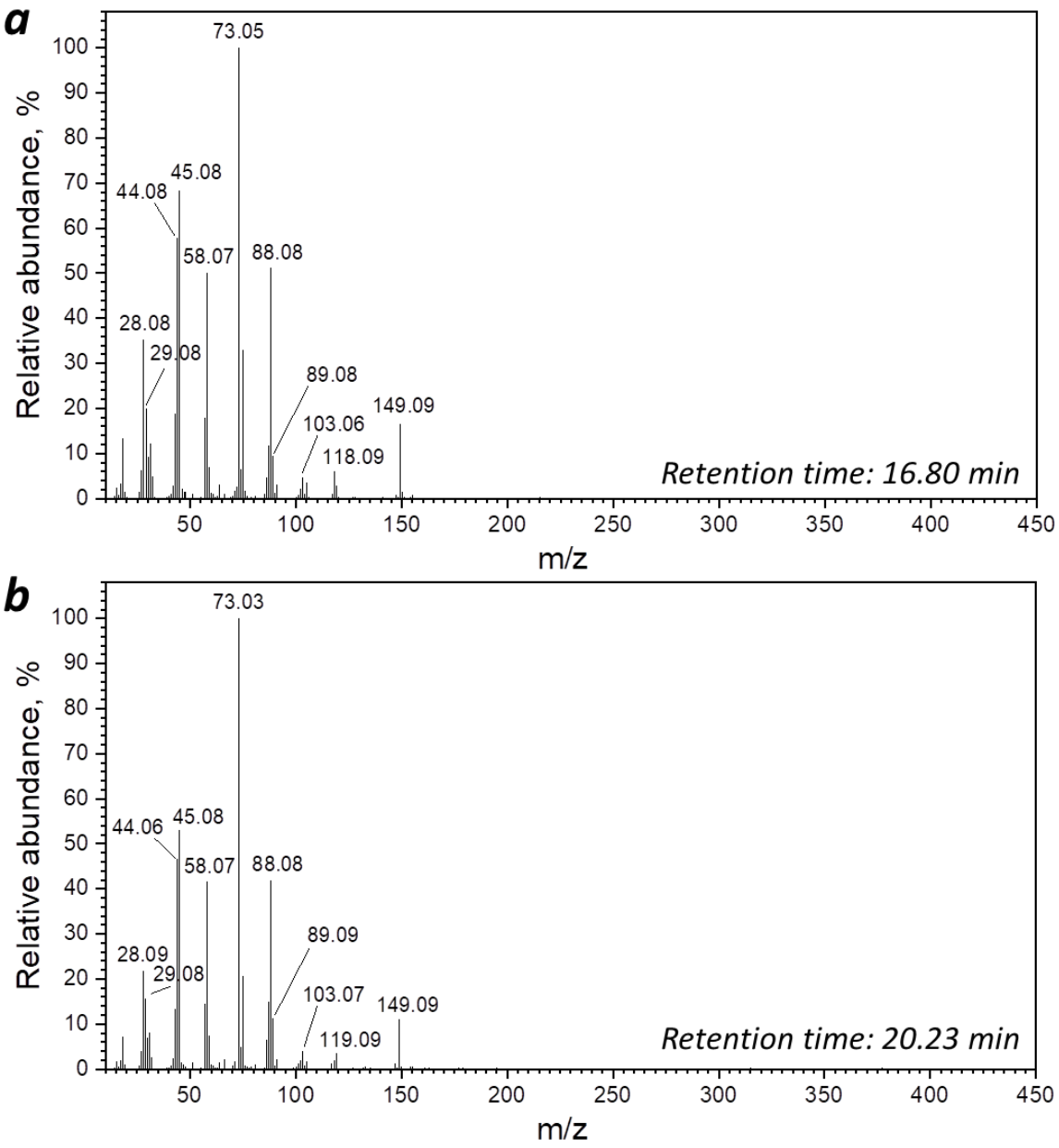

Figure S2. Mass spectra of the products formed 5 minutes after the addition of $NOPF_6$ to 1M KFSI in DOL/DME: a) GC retention time 16.80 min; b) GC retention time 20.23 min.

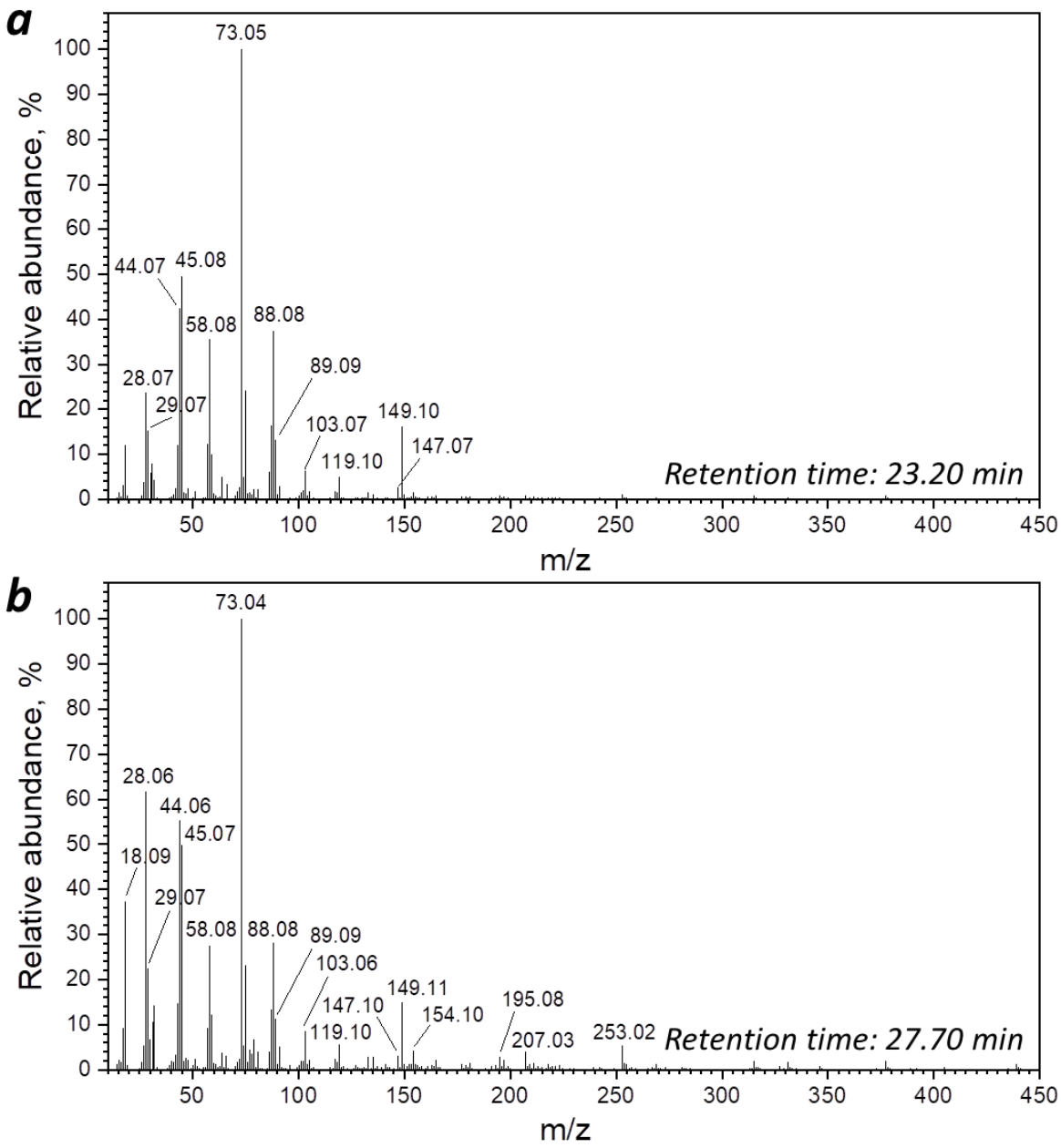

Figure S3. Mass spectra of the products formed 5 minutes after the addition of $NOPF_6$ to 1M KFSI in DOL/DME: a) GC retention time 23.20 min; b) GC retention time 27.70 min.

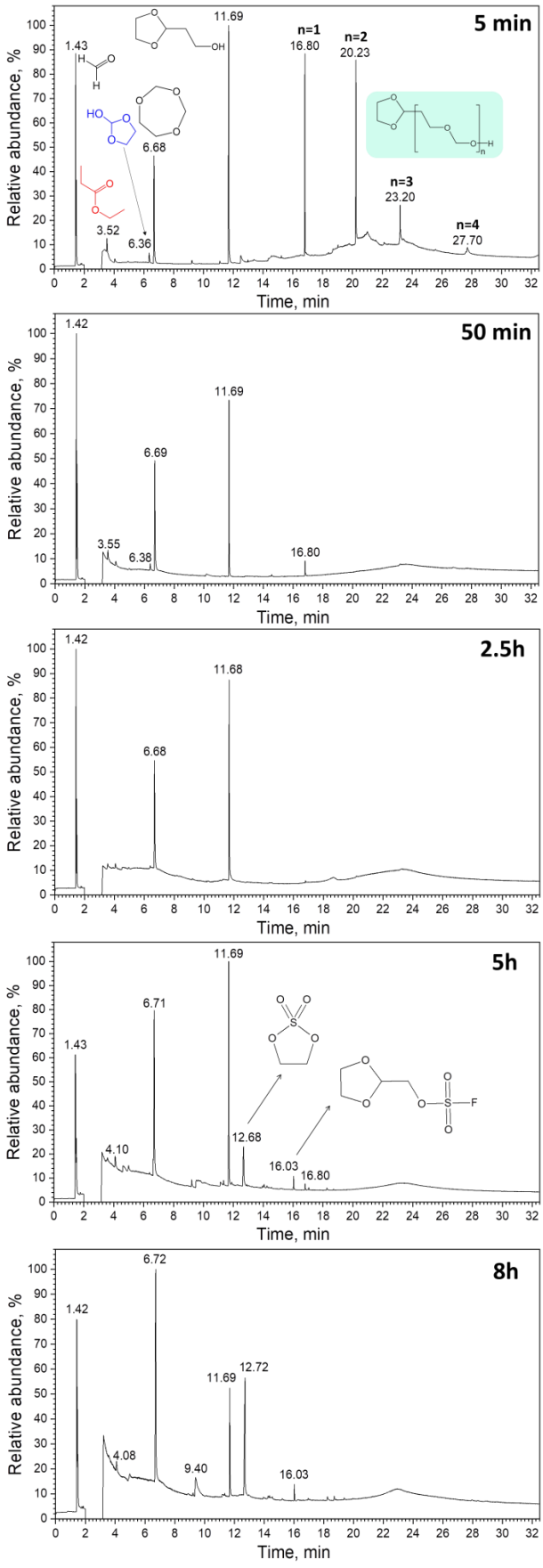

Figure S4. Time evolution of GC profile of the reaction mixture.

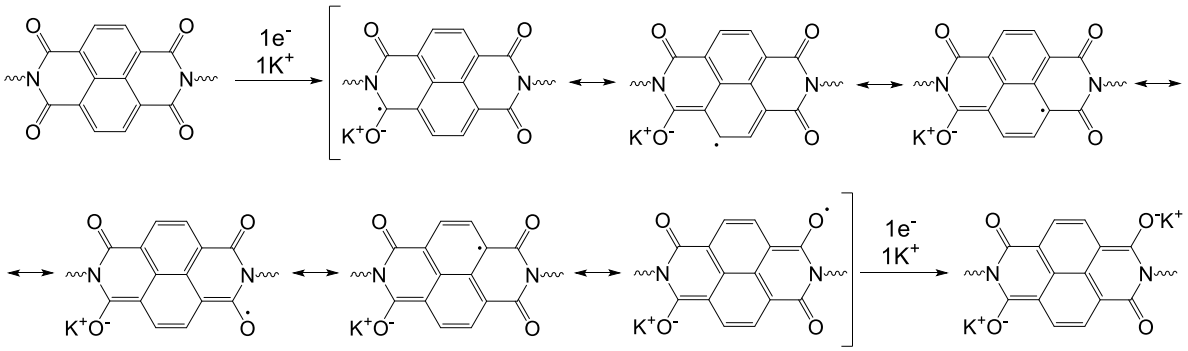

Figure S5. Charge-discharge mechanism for polyimide **PI-HY** (two-electron reduction).

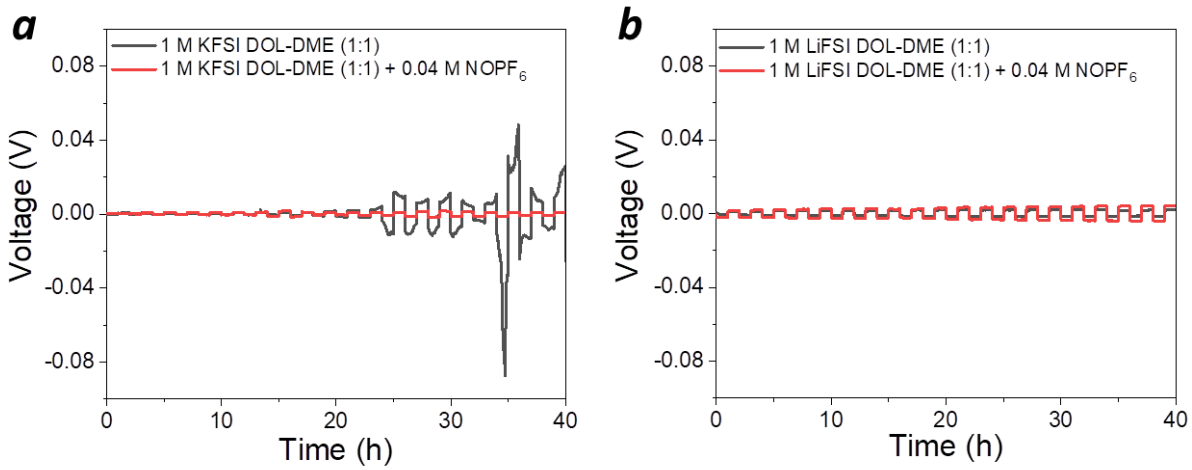

Figure S6. Electrochemical performances of the potassium plating/stripping in the symmetrical cells with K/Na alloy (a) and metallic Li (b) at the current density of 0.1 mA cm^{-1}.

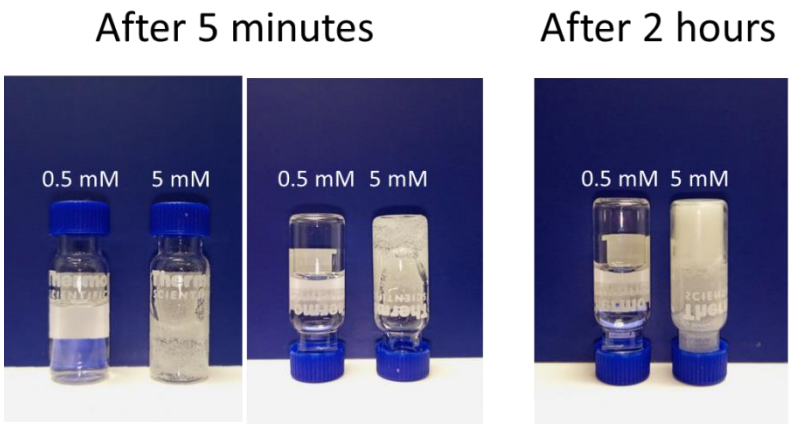

Figure S7. 0.5 mM and 5 mM $NOPF_6$ solutions in DOL 5 minutes and 2 hours after addition of $NOPF_6$.

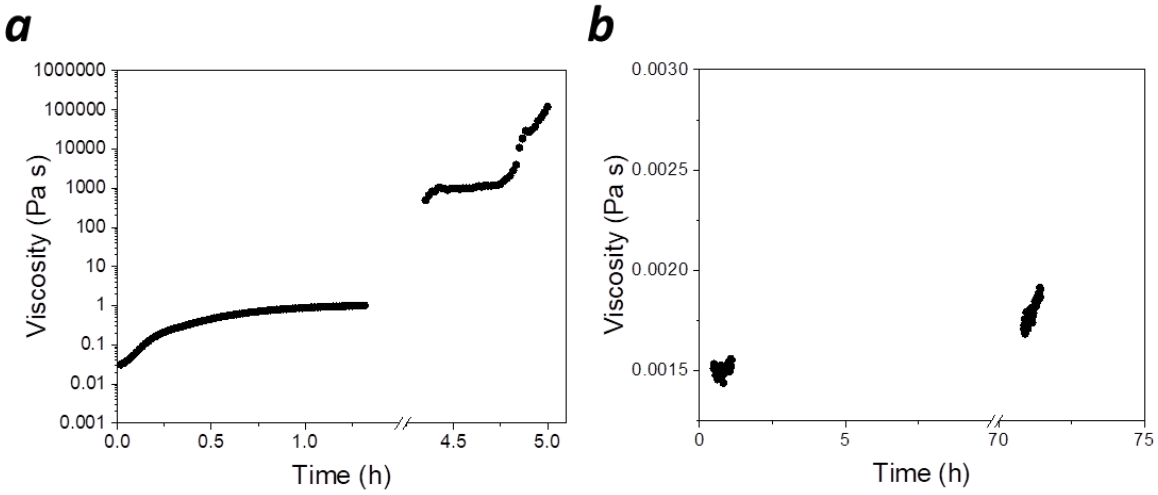

Figure S8. Dynamic viscosity versus time for 5 mM (a) and 0.5 mM (b) $NOPF_6$ solutions in DOL.

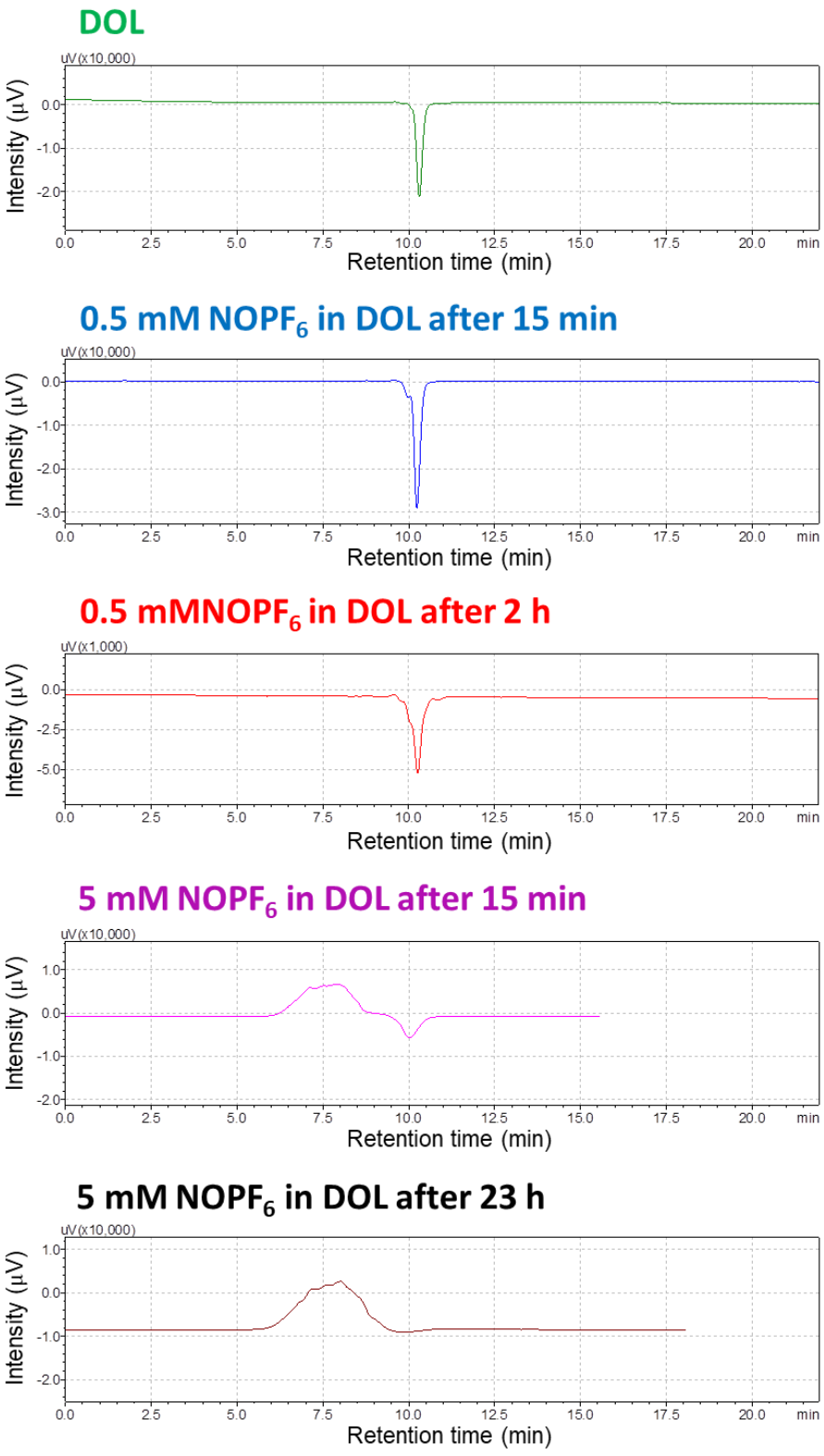

Figure S9. GPC profiles of DOL, 0.5 and 5 mM $NOPF_6$ solutions in DOL. Elution conditions: THF, 1 mL/min, 40 ^{o}C, refractive index (RI) detector.

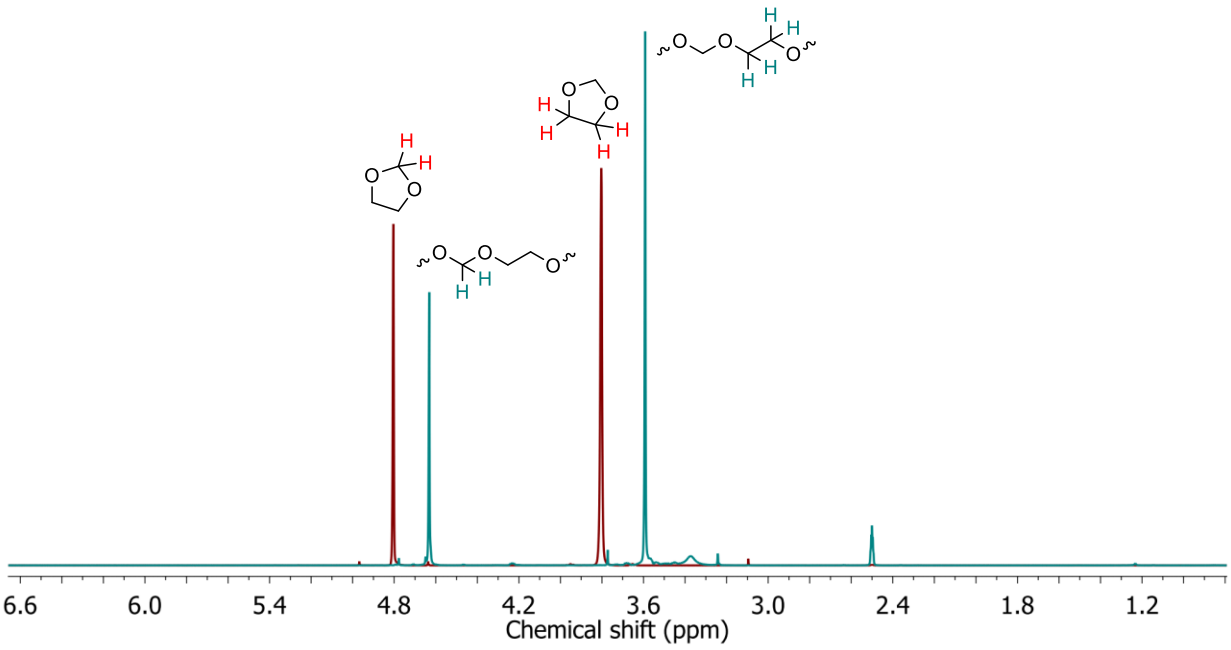

Figure S10. ^{1}H NMR spectrum of 5 mM $NOPF_6$ solution in DOL after 24 hours (blue) compared to the spectrum of pristine DOL (red) (deuterated solvent: DMSO-d6).