

Supplementary Material

Formation of monolithic ion-selective transport media in pre-formed microfluidic channels

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1 Supplementary Data

¹H-, ¹³C- & ³¹P-NMR characterization and degree of substitution calculation.

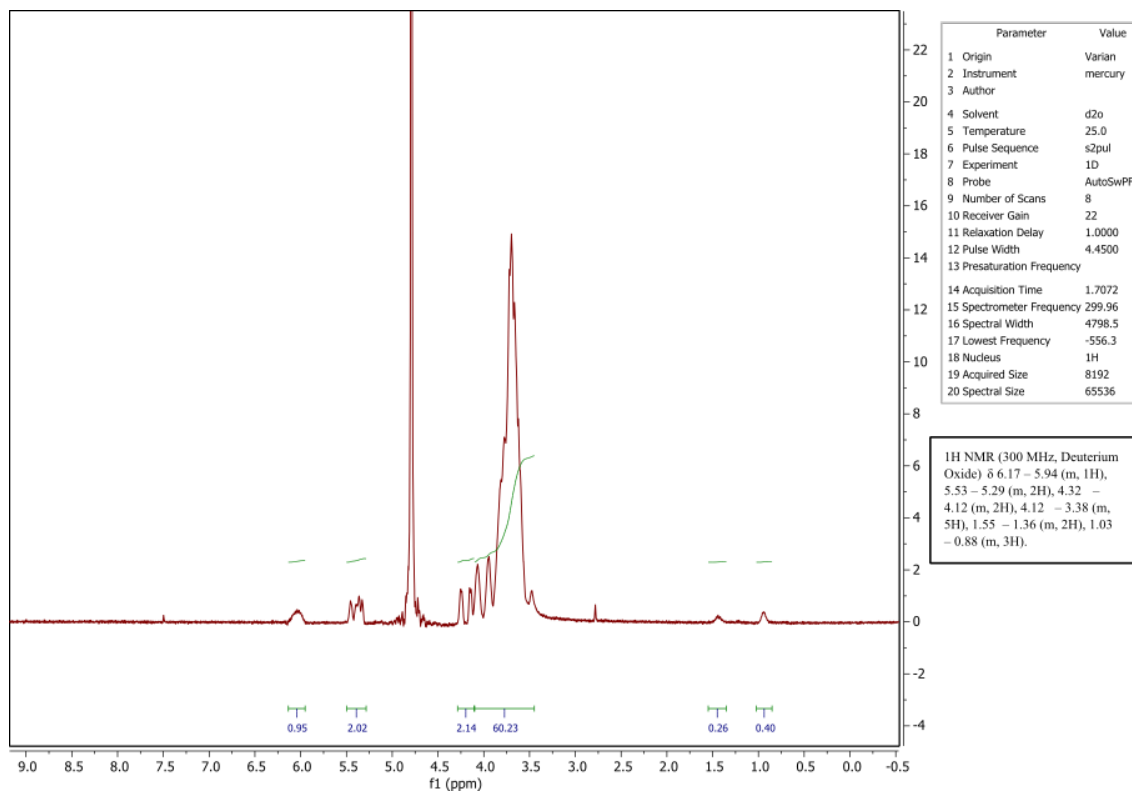
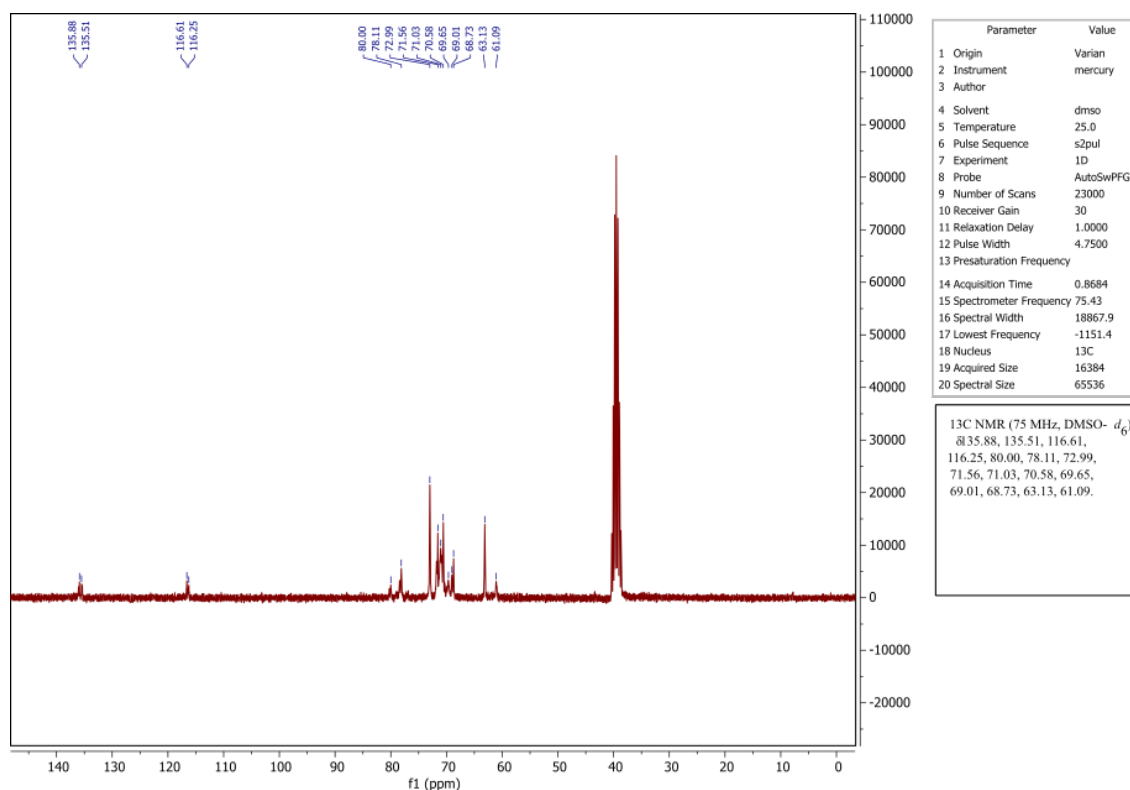


Figure S1a. ^1H -NMR (300 MHz, Deuterium Oxide) - Allyl-HPG5 (compound 2).

$$DS (\%) \text{ Allyl} = \left(\frac{\frac{2.02}{60.23}}{\frac{2}{5}} \right) \times 100 \approx 10 \%$$

Figure S1b. ^{13}C -NMR (75 MHz, $\text{DMSO}-d_6$) – Allyl-HPG5 (compound 2).

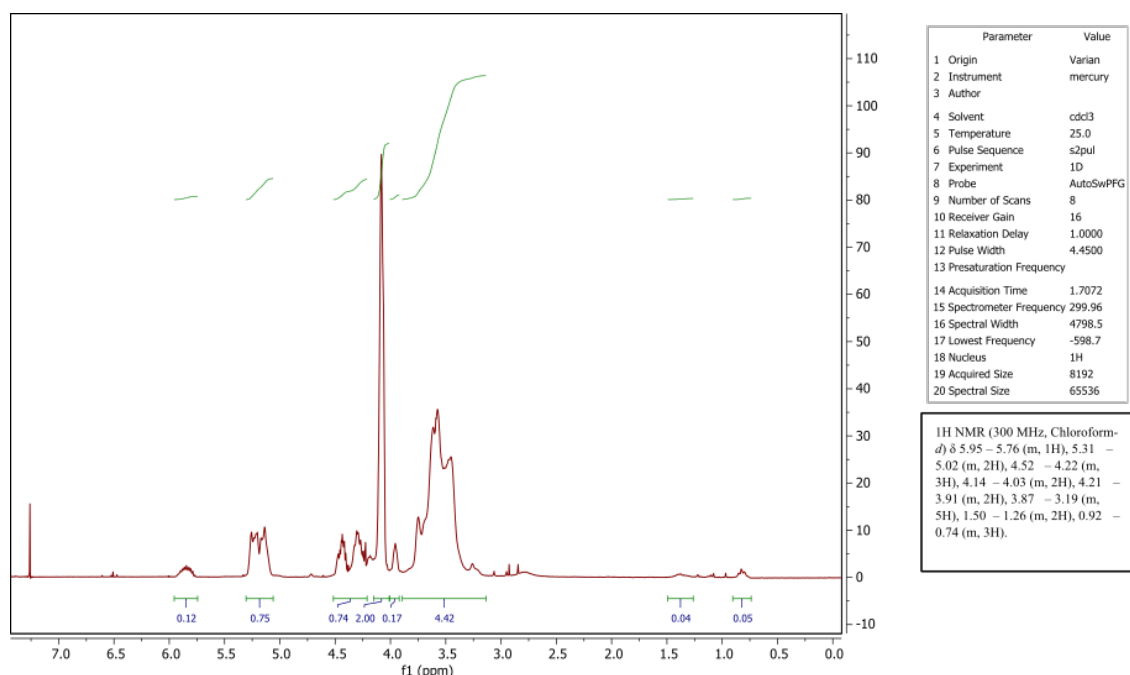


Figure S2a. ^1H -NMR (300 MHz, Chloroform-*d*) – Chloroacetate-allyl-HPG5 (compound 3).

$$DS (\%)_{\text{Chloroacetate}} = \left(\frac{\frac{2}{4.42 + 0.17 + 0.74 + 0.75 + 0.12}}{\frac{2}{5 + 5 * 0.1}} \right) \times 100 \approx 90 \%$$

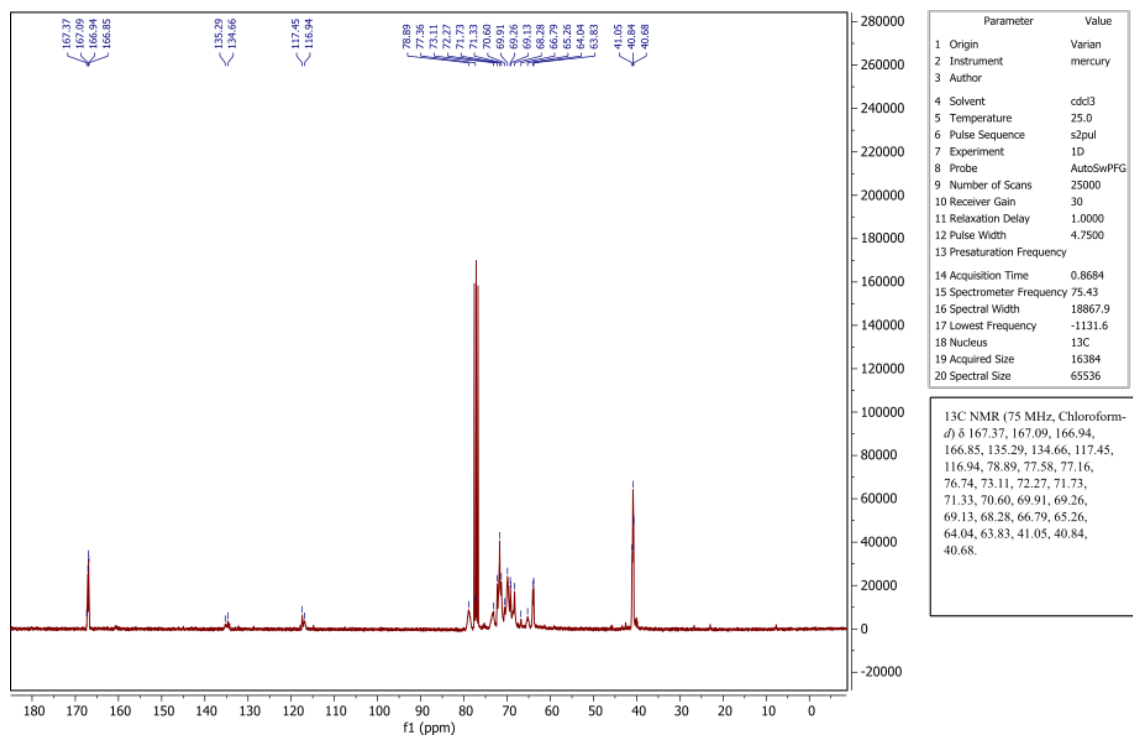


Figure S2b. ^{13}C -NMR (75 MHz, Chloroform-*d*) - Chloroacetate-allyl-HPG5 (compound 3).

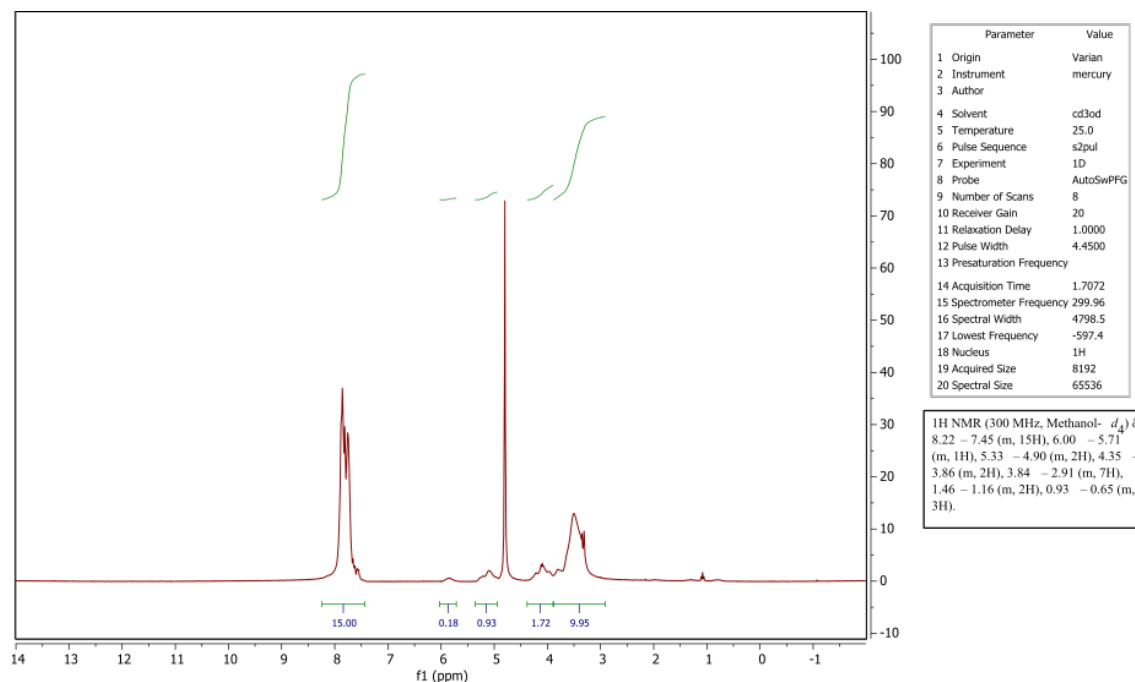
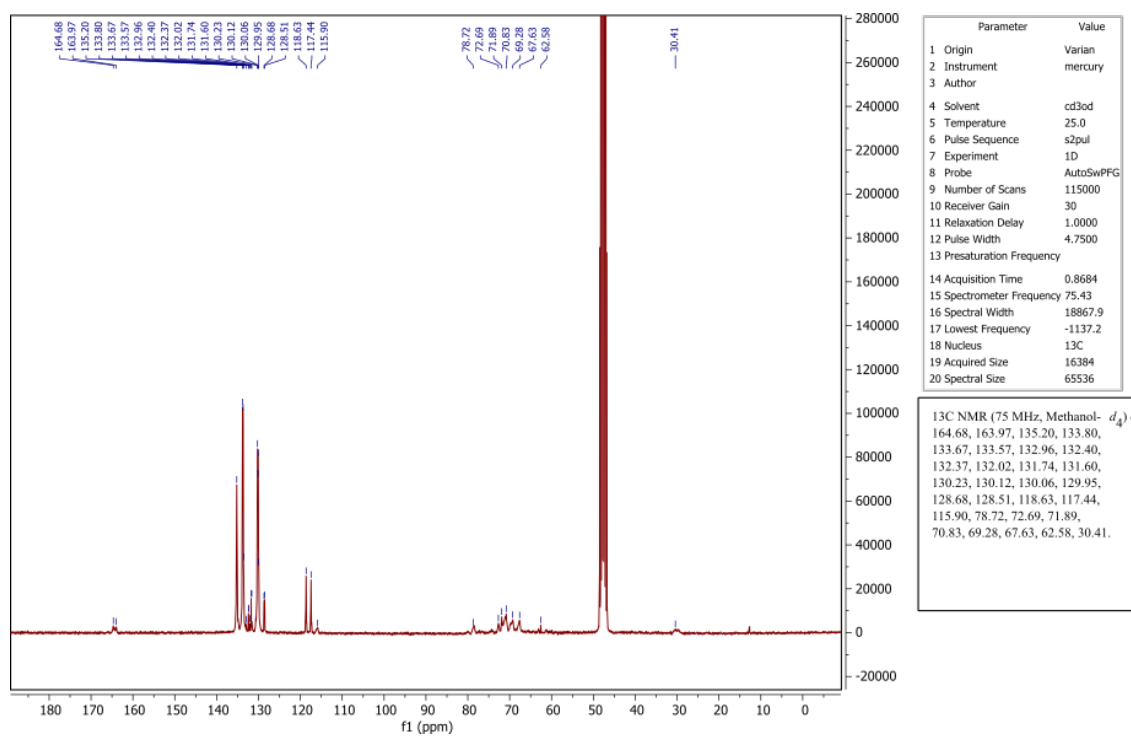


Figure S3a. ^1H NMR (300 MHz, Methanol- d_4) – C-HPG5 (compound 4).

$$DS (\%)_{\text{Triphenylphosphonium}} = \left(\frac{\frac{15}{9.95 + 1.72 + 0.93 + 0.18}}{\frac{15}{5 + 5 * 0.1 + 2 * 0.9}} \right) \times 100 \approx 60 \%$$

Figure S3b. ^{13}C NMR (75 MHz, Methanol- d_4) – C-HPG5 (compound 4).

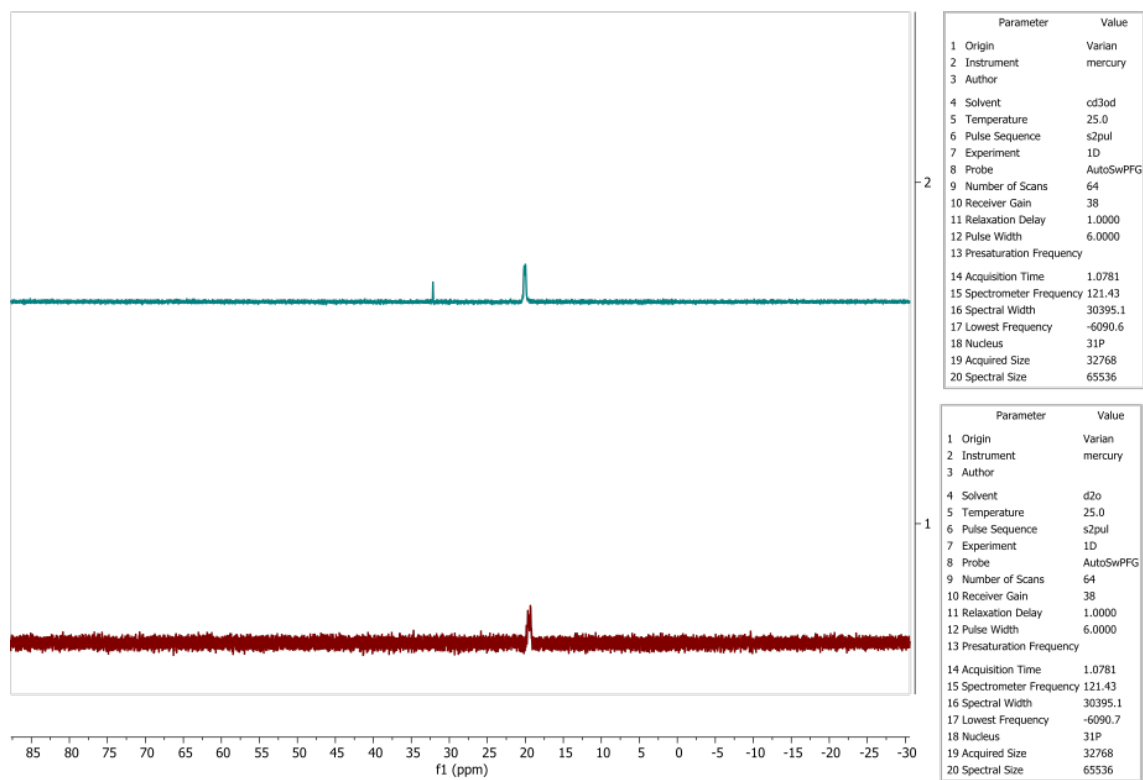


Figure S3c. ^{31}P NMR (121 MHz, Top: Methanol- d_4 , Bottom: Deuterium Oxide) – C-HPG5 (compound 4).

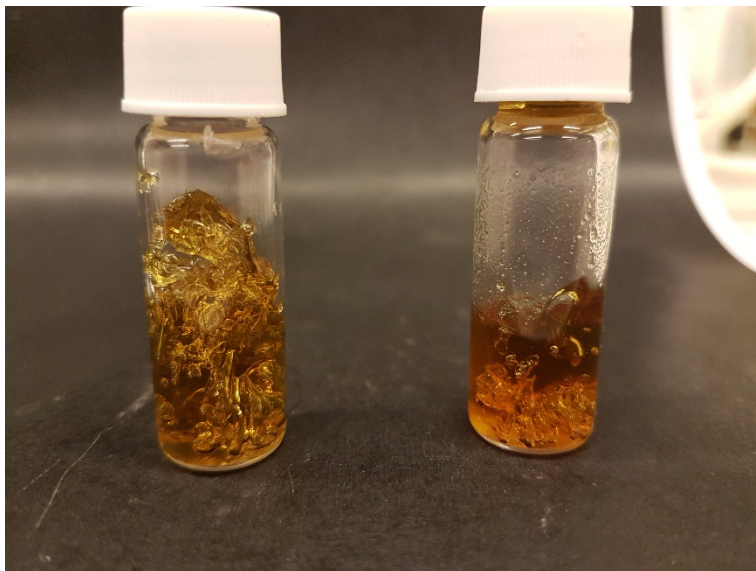


Figure S4. Thermal polymerization gelling at 70°C with C-HPG5, Thiocure ETTMP 1300, TATAO and AIBN. (Left) In methanol and (Right) in 1-propanol.

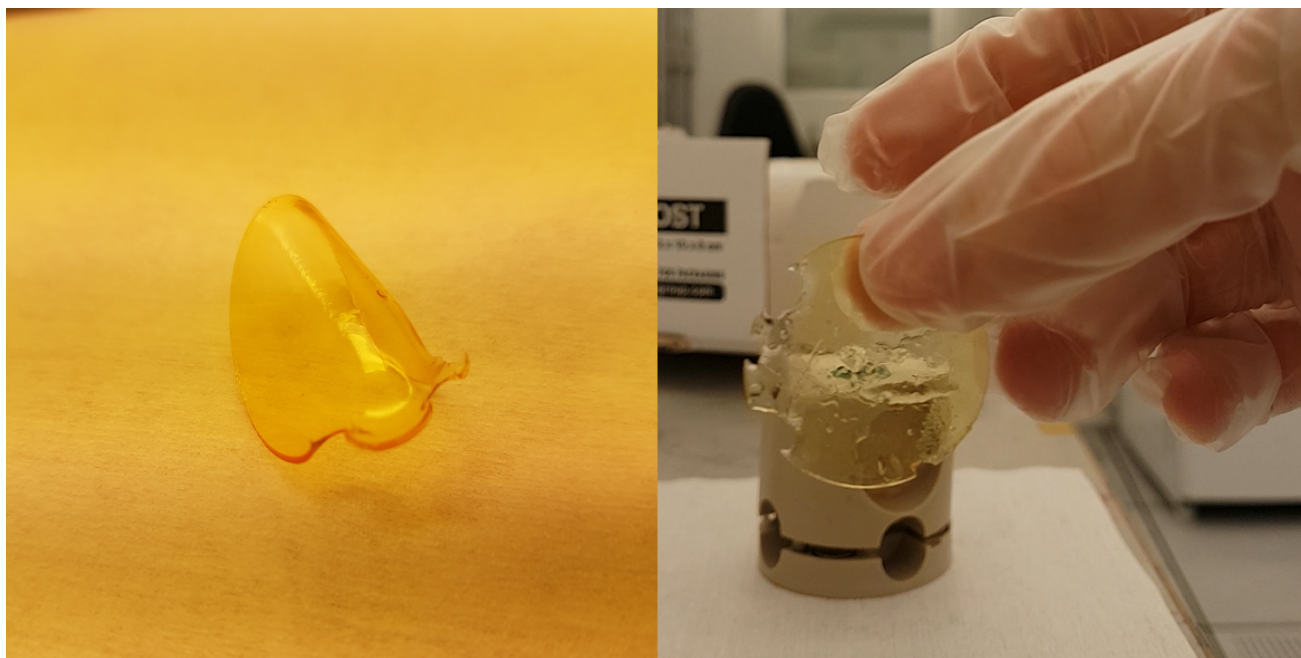


Figure 5. Left: Transparent cross-linked C-HPG5 membrane with flexibility. Right: Water swelling resulting in a more rigid membrane.

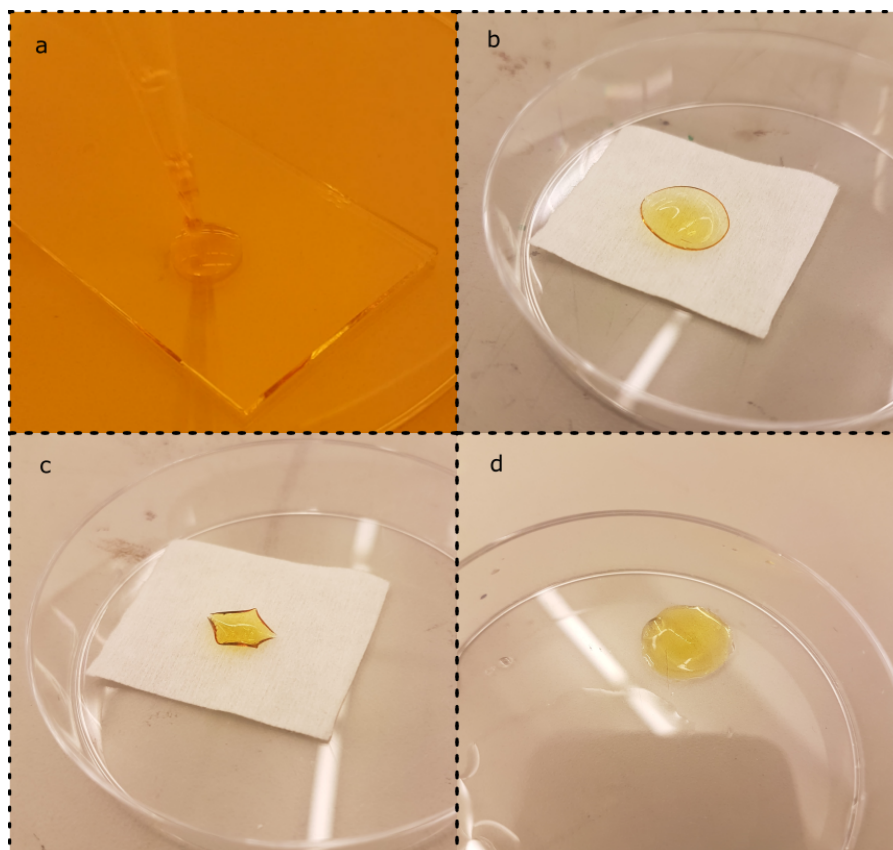


Figure S6. (a) Photo-initiated C-HPG5 methanol/water solution (Table 2. UVC4) drop-casted on glass substrate. (b) Cross-linked hydrated membrane peeled off from the surface (c) and dried in oven. (d) Rehydrated membrane in water.

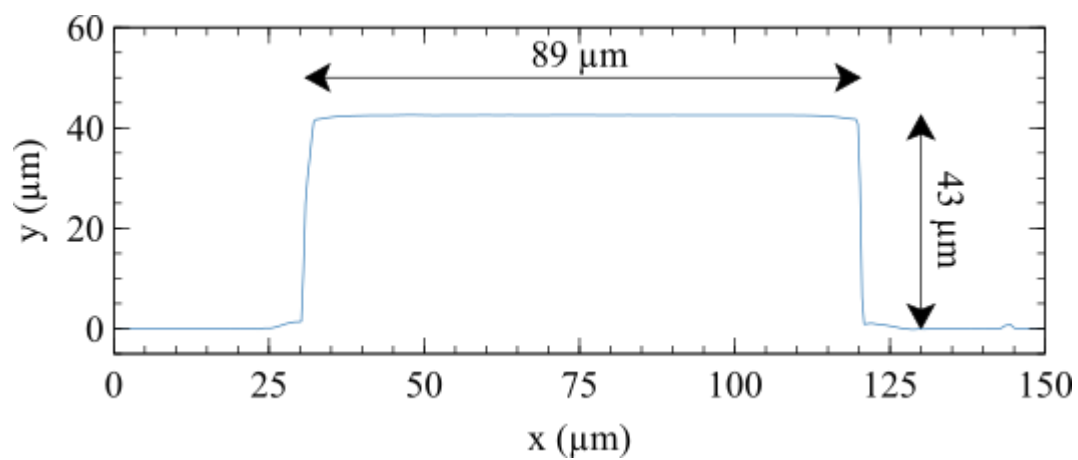


Figure S7. Channel Profile – 8 mm length channel. Optical profilometer (Sensofar PLu Neox) using a 50x confocal objective.

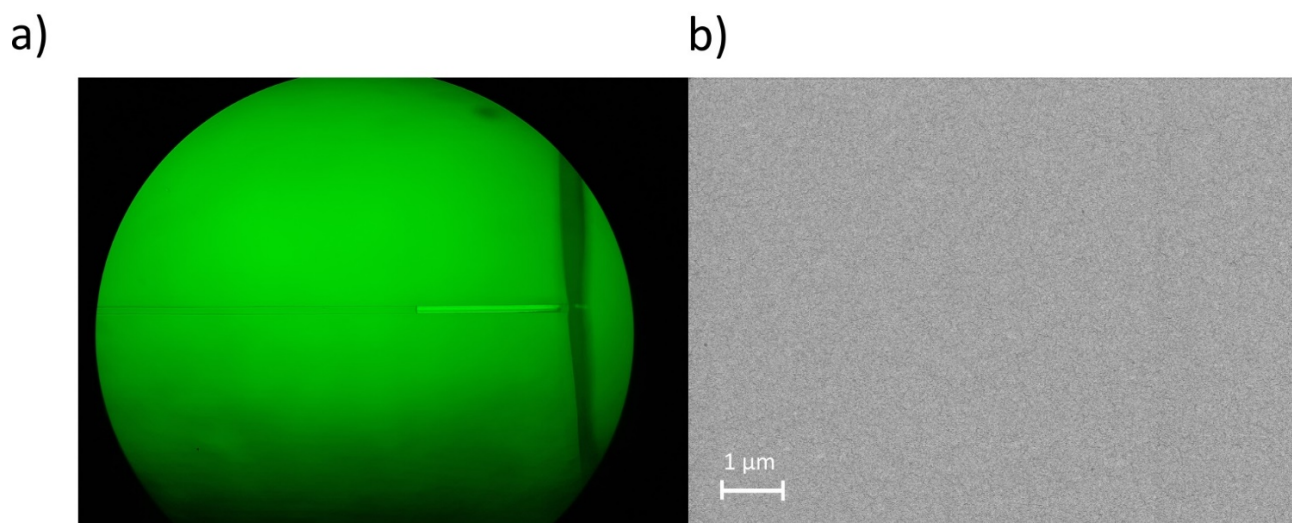


Figure S8. a) Capillary filling process of C-HPG5 monitored by microscopy. b) Scanning electron microscopy image of a fabricated, non-encapsulated C-HPG5 capillary channel.

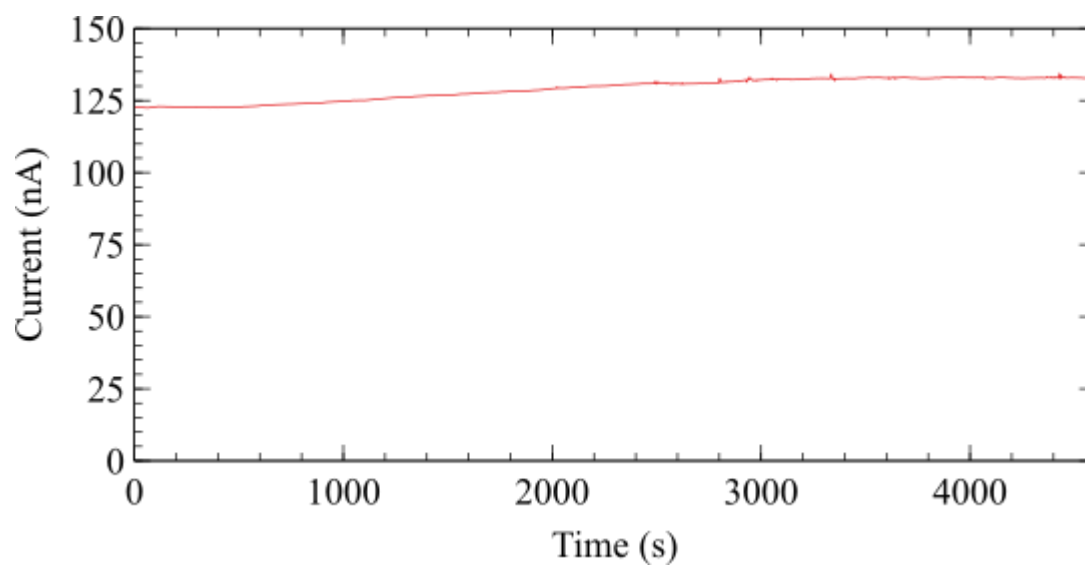


Figure S9. C-HPG5 microchannel in 0.1 M NaCl, applying 1 V.