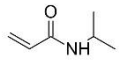
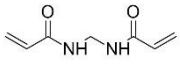
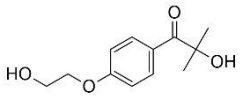
Synthesis Materials



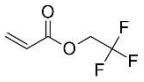
N-Isopropylacrylamide (NIPAM)



N,N'-Methylenebis(acrylamide) (MBA)

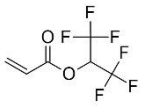


2-hydroxy-4'-(2-hydroxyethoxy)-2-methylpropiophenone (I2959)



2,2,2-Trifluoroethyl Acrylate (TFEA)

2,2,3,3,4,4,5,5,6,6,7,7-Dodecafluoroheptyl Acrylate (DFHA)

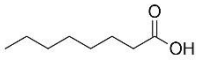


1,1,1,3,3,3-Hexafluoroisopropyl Acrylate (HFIA)

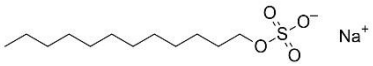
Analytes

Phenol (Ph)

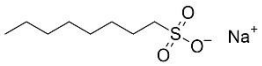
Methanol (MeOH)



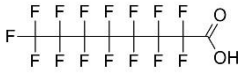
Octanoic Acid (OA)



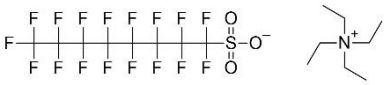
Sodium Dodecyl Sulfate (SDS)



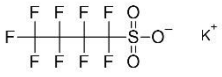
Sodium Octyl Sulfonate (SOS)



Perfluorooctanoic Acid (PFOA)

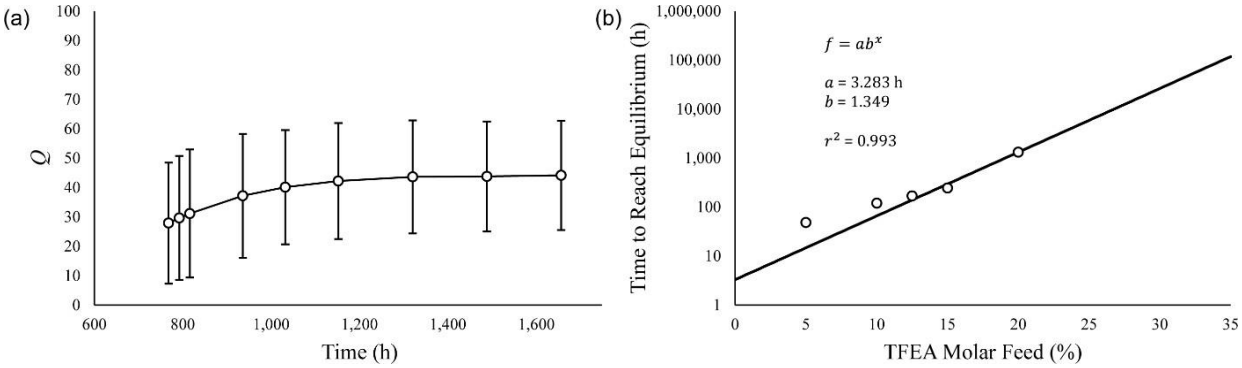


Tetraethylammonium Perfluorooctane Sulfonate (TPFOS)

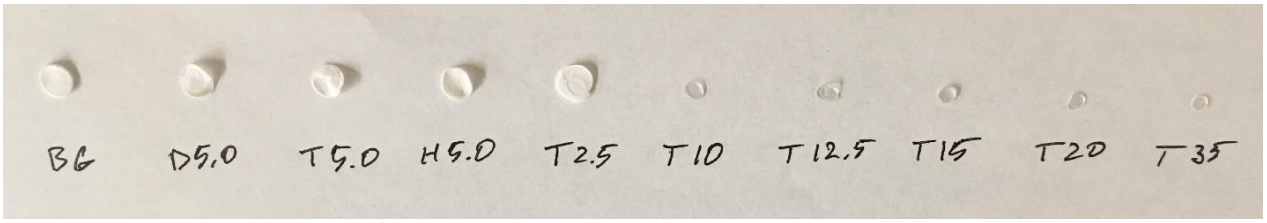


Potassium Perfluorobutane-1-sulfonate (PFBS)

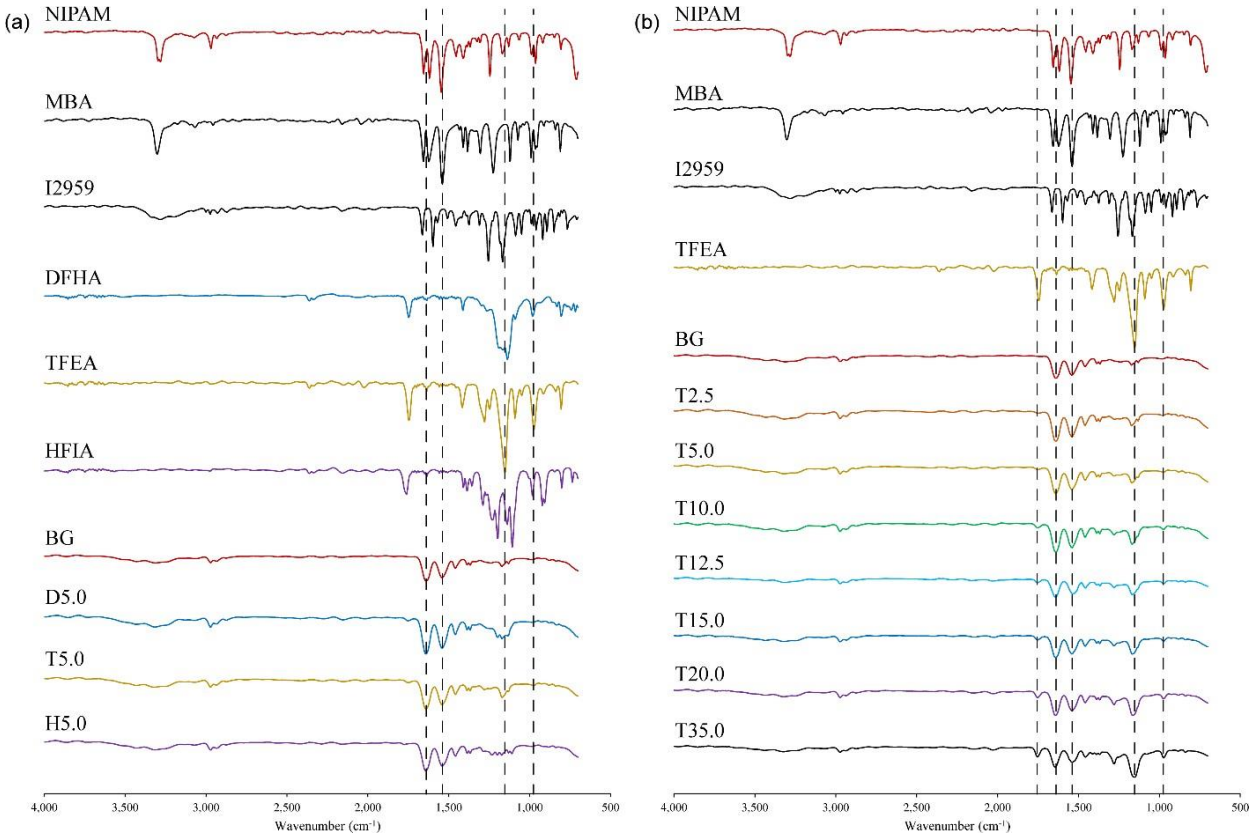
Supplementary Figure 1: Materials used throughout the syntheses of fluorinated PNIPAM copolymers and accompanying swelling tests.



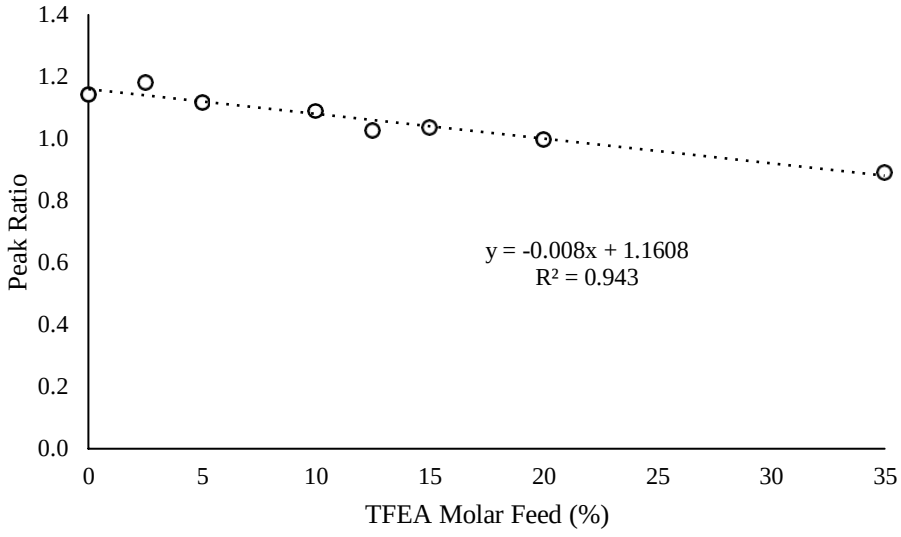
Supplementary Figure 2: (a) Kinetic swelling analysis of T20.0 gels soaked in 1 mM tetraethylammonium perfluorooctane sulfonate. (b) Plotted equilibration times from (a) and Figure 3 (a) fit logarithmically. Swelling ratios in (a) represent a single standard deviation for n = 3 gels.



Supplementary Figure 3: Photograph of hydrogels ranging in comonomer type and feed ratio. Acronyms are detailed in Table 1.

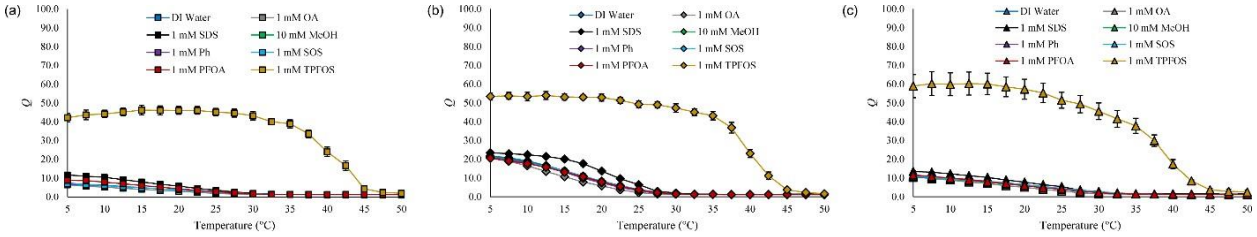


Supplementary Figure 4: Fourier-transform infrared (FTIR) spectra for all monomers and gels used throughout the study. Initial comonomer survey for 1*H*,1*H*,7*H*-dodecafluoroheptyl acrylate (DFHA), 2,2,2-trifluoroethyl acrylate (TFEA), and 1,1,1,3,3,3-hexafluoroisopropyl acrylate (HFIA) with their respective hydrogels are provided in (a). Feed ratio incrementation of TFEA is shown in (b). Guidelines correspond to 1,639 cm^{-1}, 1,539 cm^{-1}, 1,153 cm^{-1}, and 976 cm^{-1} in (a) and 1,755 cm^{-1}, 1,639 cm^{-1}, 1,539 cm^{-1}, 1,153 cm^{-1}, and 976 cm^{-1} in (b).

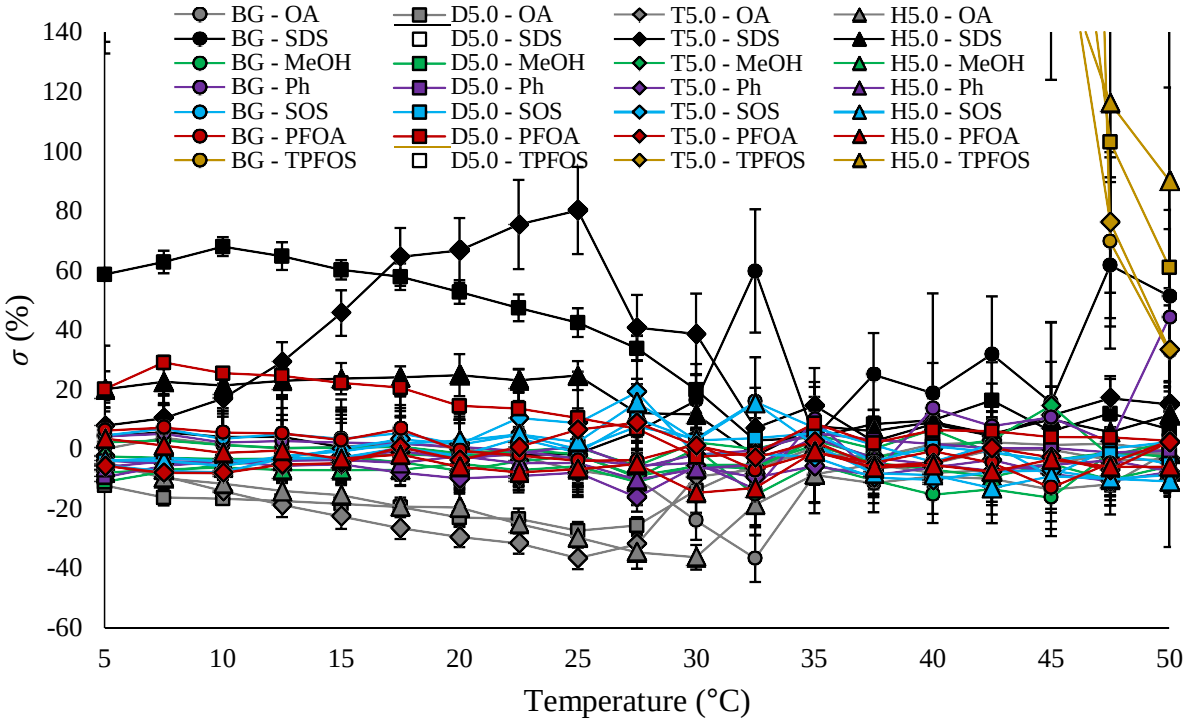


Supplementary Figure 5: Ratio of the CF_x peak transmittance from 1,173cm^{-1} to 1,153 cm^{-1} to the amide I peak at 1,639 cm^{-1} for gels synthesized with varying feed ratios of 2,2,2-trifluoroethyl acrylate (TFEA).

Swelling response for BG samples are from our previous publication.[1]

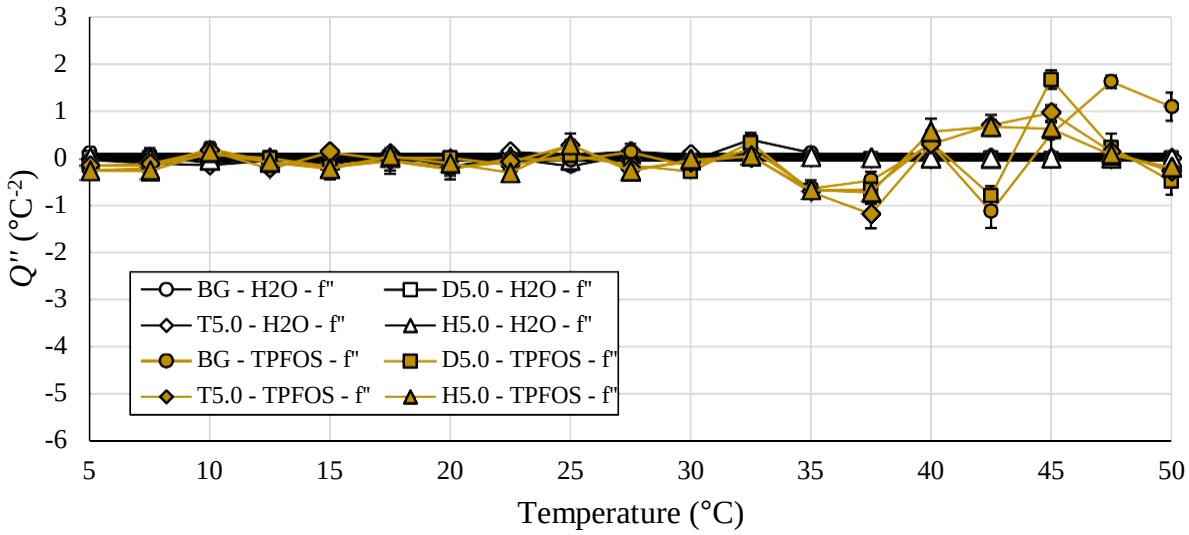


Supplementary Figure 6: Swelling ratios for gels synthesized with 5 mol% feeds of (a) 1*H*,1*H*,7*H*-dodecafluoroheptyl acrylate, (b) 2,2,2-trifluoroethyl acrylate, and (c) 1,1,1,3,3,3-hexafluoroisopropyl acrylate exposed to DI water (dark blue), 1 mM octanoic acid (OA, gray), 1 mM sodium dodecyl sulfate (SDS, black), 10 mM methanol (MeOH, green), 1 mM phenol (Ph, purple), 1 mM sodium octyl sulfonate (SOS, light blue), 1 mM perfluorooctanoic acid with 10 mM methanol (PFOA, red), and 1 mM tetraethylammonium perfluorooctane sulfonate (TPFOS, gold). Error bars represent a single standard deviation for $n = 3$ gels.

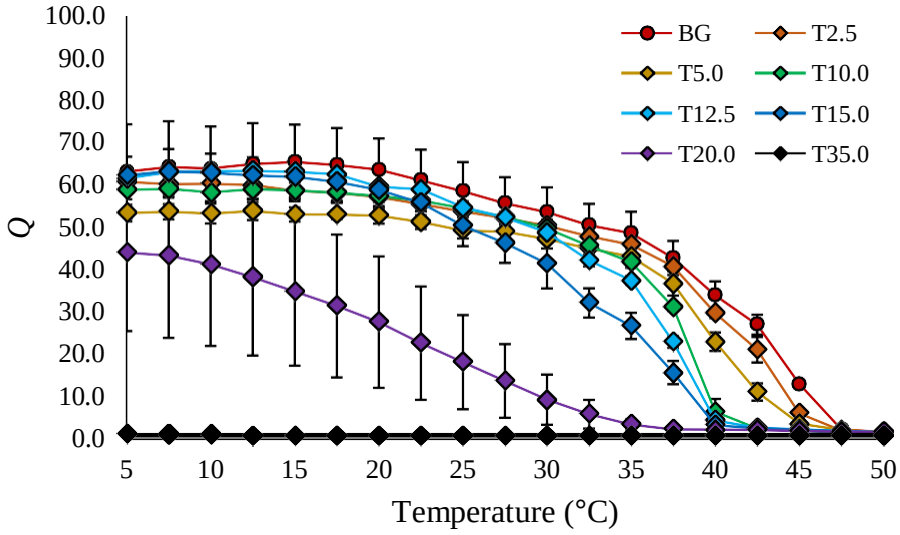


Supplementary Figure 7: Zoomed view of the water-analyte swelling differences for chemicals examined in Figure 2 (a). Error bars represent a single standard deviation for $n = 3$ gels.

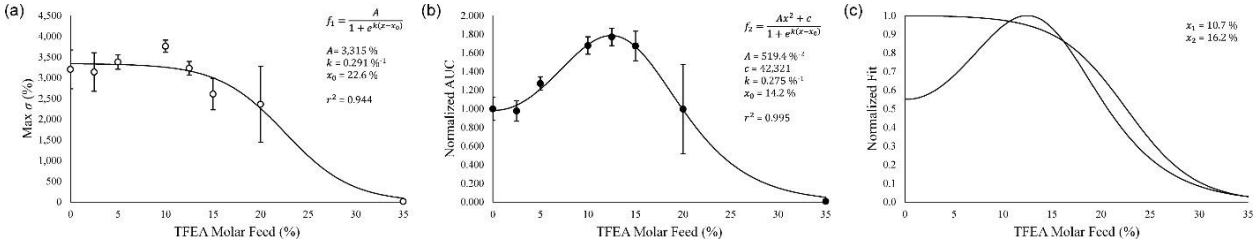
Swelling derivatives were approximated using second-order finite difference.



Supplementary Figure 8: Second derivative of the swelling ratio as a function of temperature for gels without (BG, circles) or with 5 mol% feeds of 1*H*,1*H*,7*H*-dodecafluoroheptyl acrylate (D5.0, squares), 2,2,2-trifluoroethyl acrylate (T5.0, diamonds), or 1,1,1,3,3,3-hexafluoroisopropyl acrylate (H5.0, triangles) in DI water (H2O, white) or 1 mM tetraethylammonium perfluorooctane sulfonate (TPFOS, gold). Error bars represent a single standard deviation for $n = 3$ gels.



Supplementary Figure 9: Swelling ratios for gels formed without (BG) or with varying concentrations of 2,2,2-trifluoroethyl acrylate exposed to 1 mM tetraethylammonium perfluorooctane sulfonate. Error bars represent a single standard deviation for $n = 3$ gels.



Supplementary Figure 10: Plotted (a) maximum water-analyte swelling differences and (b) area under the curve (AUC) for gels synthesized with varying feed ratios of 2,2,2-trifluoroethyl acrylate (TFEA) soaked in 1 mM tetraethylammonium perfluorooctane sulfonate. Data in (a) was fit logistically; data in (b) was fit with an empirical adaptation of the logistic fit in (a). Normalized fits were compared in (c) to award intersections at 10.7 mol% and 16.2 mol% TFEA feeds. Error bars in (a) and (b) represent a single standard deviation for n = 3 gels.

1. Savage, D. T.; Briot, N. J.; Hilt, J. Z.; Dziubla, T. D., On the Swelling Behavior of Poly(*N*-Isopropylacrylamide) Hydrogels Exposed to Perfluoroalkyl Acids. *Journal of Polymer Science* **Submitted for review**.