Electronic Supplementary Material (ESI) for Chemical Communications


# Supramolecular Hydrogel Based on the Epitope of Potassium Ion Channels

Yi Kuang, Yuan Gao, Junfeng Shi, Hsin-Chieh Lin, Bing Xu*

Synthesis of Fmoc-TIGYG (**1**): The compound was synthesized by standard solid phase peptide synthesis and purified by flash column. $^1$H NMR (400 MHz, DMSO-$d_6$): δ 9.16 (s, 1H), 8.36 (m, 1H), 8.15 (m, 1H), 8.05 (m, 1H), 7.90 (d, *J*=4.0 Hz, 2H), 7.74 (m, 2H), 7.42 (t, *J*=8.0 Hz, 2H), 7.32 (t, *J*=8.0 Hz, 2H), 7.17 (dd, *J*=6.0 Hz, 30.0 Hz, 2H), 7.01 (d, *J*=4.0 Hz, 2H), 6.62 (d, *J*=4.0 Hz, 2H), 4.82 (b, 1H), 4.44 (m, 1H), 4.17 (m, 4H), 4.02 (m, 1H), 3.92 (m, 1H), 3.75 (d, *J*=4.0 Hz, 2H), 3.72 (m, 1H), 3.60 (m, 1H), 2.90 (m, 1H), 2.63 (m, 1H), 1.69 (m, 1H), 1.44 (m, 1H), 1.02 (m, 4H), 0.80 (m, 6H).

Synthesis of Fmoc-TGGIY (**2**): The compound was synthesized by standard solid phase peptide synthesis and purified by flash column. $^1$H NMR (400 MHz, DMSO-$d_6$): δ9.21 (s, 1H), 8.25 (m, 1H), 8.17 (m, 1H), 8.06 (m, 1H), 7.90 (d, *J*=4.0 Hz, 2H), 7.75 (m, 2H), 7.42 (t, *J*=8.0 Hz, 2H), 7.33 (t, *J*=8.0 Hz, 2H), 7.14 (d, *J*=4.0 Hz, 2H), 7.00 (d, *J*=4.0 Hz, 2H), 6.63 (d, *J*=4.0 Hz, 2H), 4.85 (b, 1H), 4.24 (m, 5H), 3.89 (m, 3H), 3.76 (m, 3H), 3.52 (m, 1H), 2.83 (m, 2H), 1.69 (m, 1H), 1.34 (m, 1H), 1.05 (m, 4H), 0.79 (m, 6H).

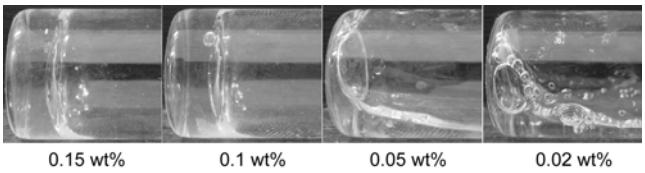


*Figure S1*. Gelation tests of **1** at various concentration of **1** and constant ratio of [$K^+$]/[**1**] = 2.33.

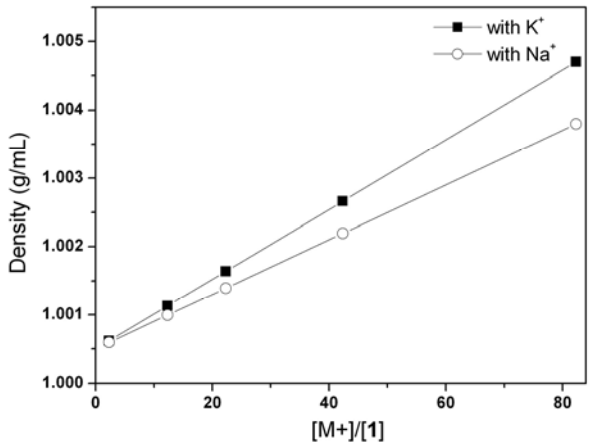


*Figure S2*. Density change of the hydrogels or solutions of **1** versus [$M^+$]/[**1**]. [**1**] = 0.68 mM; 0.05 wt%.

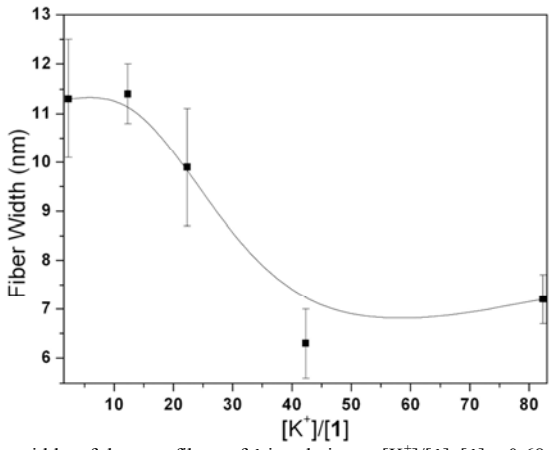


*Figure S3*. The widths of the nanofibers of **1** in relation to [$K^+$]/[**1**]. [**1**] = 0.68 mM; 0.05 wt%.

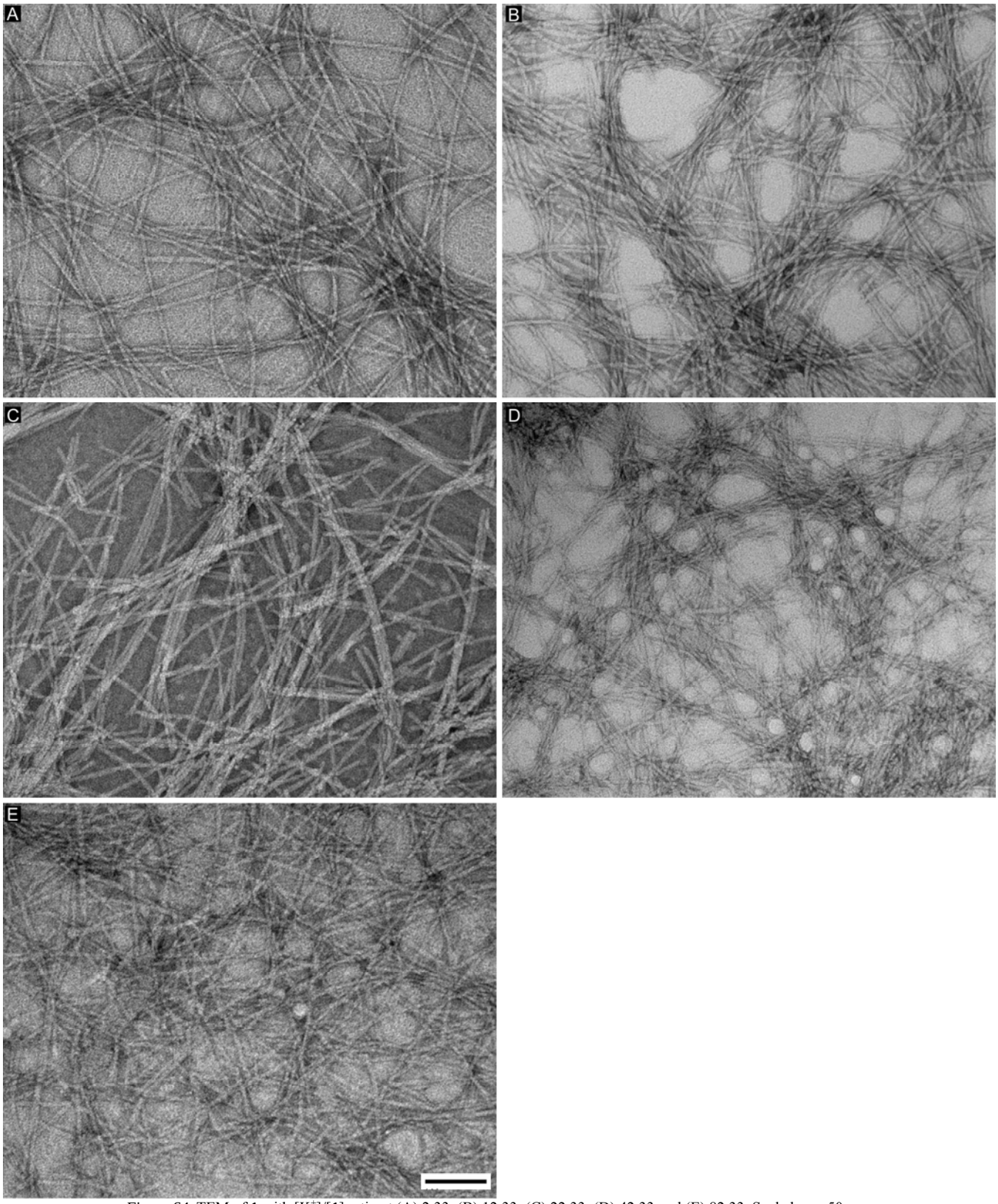


*Figure S4*. TEM of **1** with $[K^+]/[\mathbf{1}]$ ratio at (A) 2.33, (B) 12.33, (C) 22.33, (D) 42.33 and (E) 82.33. Scale bar = 50 nm.

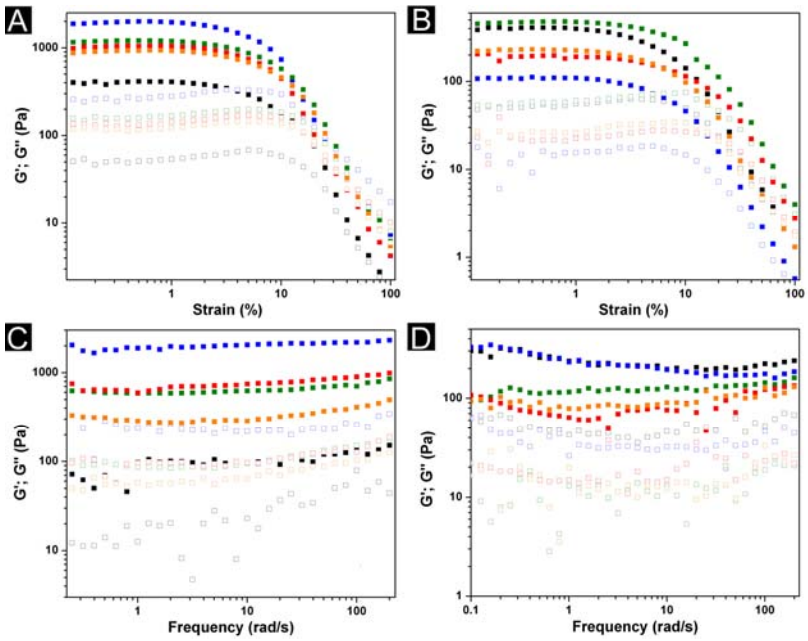


*Figure S5.* (A) The strain and (C) frequency sweep of the hydrogels or solutions formed by 0.05 wt% of **1** with $K^+$. (B) The strain and (D) frequency sweep of the viscous solutions formed by 0.05 wt% of **1** with $Na^+$. Symbol of molar ratio $[M^+]/[\mathbf{1}]$ at 2.33 (black), 12.33 (blue) 22.33 (green), 42.33 (red) and 82.33 (orange). Filled symbol represents storage modulus ($G'$), open symbol represents loss modulus ($G''$).

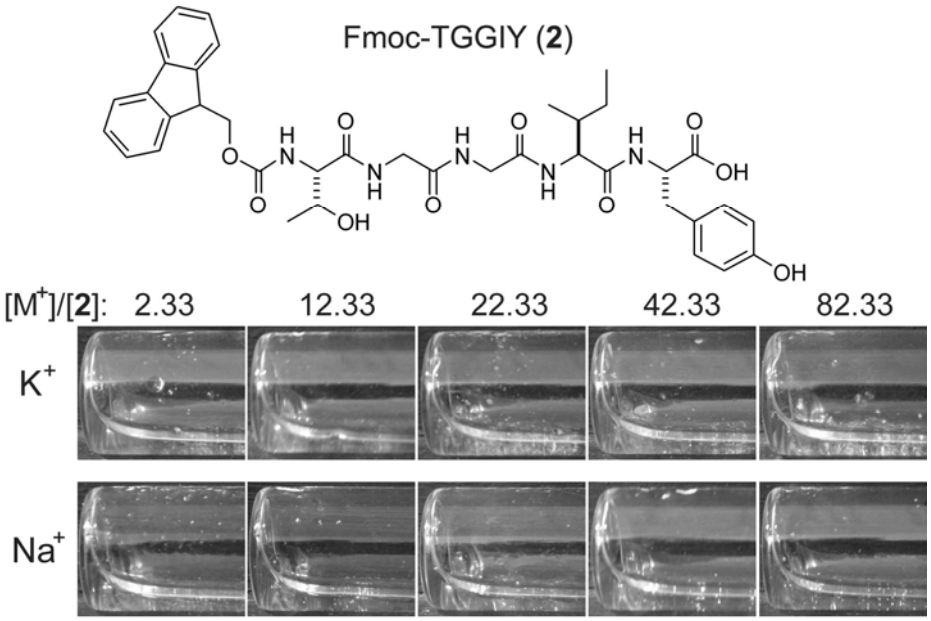


*Figure S6.* The chemical structure of **2** and optical images of gelation tests of **2** (0.05 wt%, 0.68mM) with different concentration of $K^+$ or $Na^+$ at pH 4.0.