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Supporting Information

Morphologic transformation of ultrasonically obtained nanofibers during living self-assembly

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1. Synthesis of COOH-Functionalized Imidazolium SAILs

N-alkyl-N′ -carboxymethyl imidazolium bromides ([N-C$_n$, N′ -COOH-Im]Br, n=6, 12) were prepared according to the previous literature [1]. The ^{1}HNMR spectra were recorded by a Bruker AV-400 NMR spectrometer with a pulse field gradient module (Z-axis).

1.1 ^{1}H NMR (400 MHz, D_2O) of [N-C_6, N′ -COOH-Im]Br: δ=8.92 (dd, J = 53.4, 38.7 Hz, 1H), 7.69 - 7.35 (m, 2H), 4.70 (s, 2H), 4.26 - 4.18 (m, 2H), 1.86 (d, J = 4.2 Hz, 2H), 1.26 - 1.13 (m, 6H), 0.79 (t, J = 7.0 Hz, 3H).

1.2 ^{1}H NMR (400 MHz, D_2O) of [N-C_{12}, N′ -COOH-Im]Br: δ=8.67 (s, 1H), 7.48 - 7.29 (m, 2H), 4.77 (t, J = 28.2 Hz, 2H), 4.12 (t, J = 7.1 Hz, 2H), 1.87 - 1.69 (m, 2H), 1.27 - 0.98 (m, 18H), 0.76 (t, J = 6.8 Hz, 3H).

2. Synthesis of 1-dodecyl-3-methylimidazolium bromide

1-Methylimidazole and excess 1-bromododecane were added into the circular bottom flask and dichloromethane was added as the solvent. The mixture was heated to 75-80 ℃ for 48 h under stirring and nitrogen protection. After the reaction, the reactants were cooled and the excess dichloromethane was removed with a rotary evaporator. The product was recrystallized at least three times by ethyl acetate, and finally the white powder solid was obtained. The solid was dried in a vacuum drying oven at 55 ℃ for 48 h to obtain the final product 1-dodecyl-3-methylimidazolium bromide. ^{1}H NMR (400 MHz, D_2O) of [N-C_{12}, N′ -CH_3-Im]Br: δ 7.45 (dd, J = 7.4, 1.9 Hz, 2H), 4.16 (t, J = 7.3 Hz, 2H), 3.83 (s, 3H), 1.85 - 1.70 (m, 2H), 1.17 (d, J = 39.6 Hz, 18H), 0.72 (t, J = 6.7 Hz, 3H).

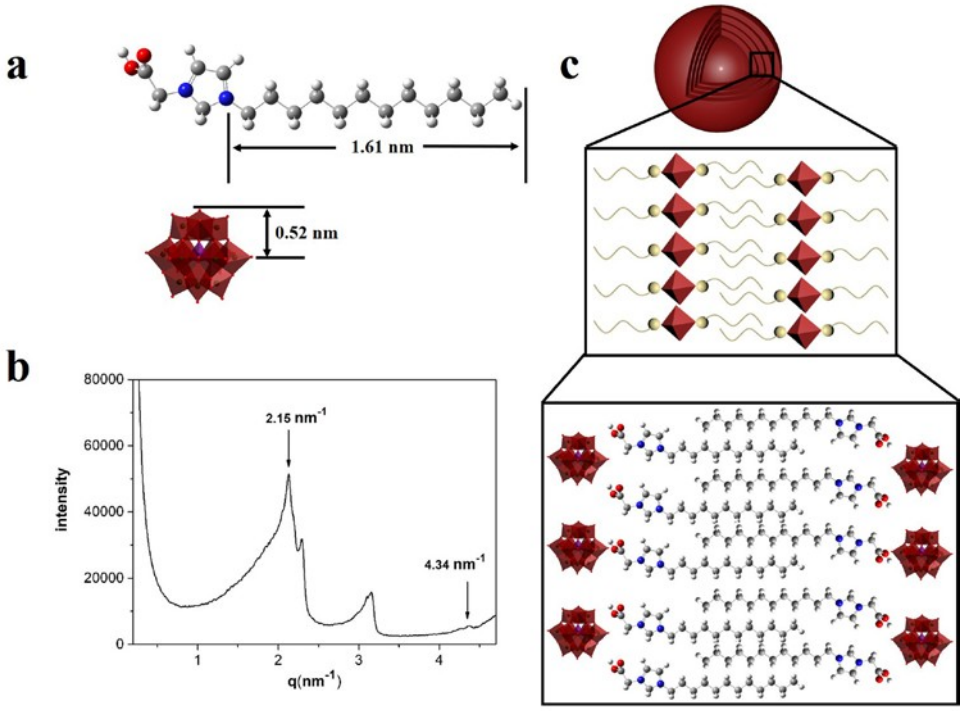

Fig. S1 (a) Geometry of [N-C_{12}, N′-COOH-Im]Br optimized at the B3LYP/6-31G(d,p) level and schematic view of POM. (b) The small angel X-ray scattering (SAXS) diffractogram of the POM/[N-C_{12}, N′-COOH-Im]Br hybrid materials. (c) Schematic illustration of the structure of POM/[N-C_{12}, N′-COOH-Im]Br hybrid materials.

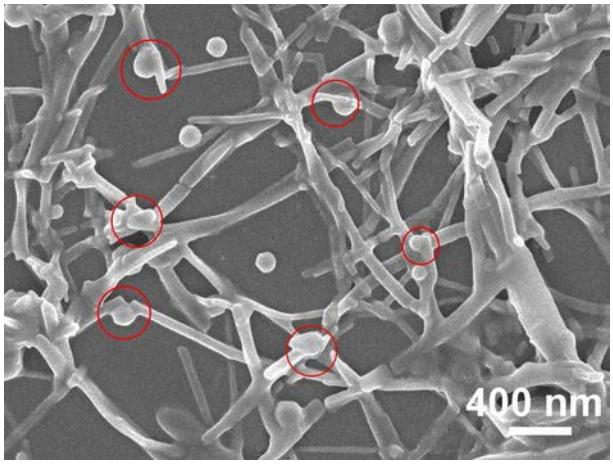

Fig. S2 SEM image of the elongation process for POM/[N-C_{12}, N′ -COOH-Im]Br hybrid materials.

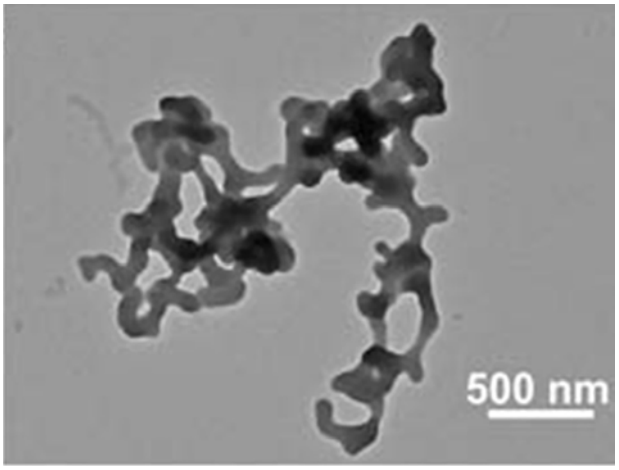

Fig. S3 TEM image of POM/[N-C_{12}, N′ -CH_3-Im]Br hybrid materials.

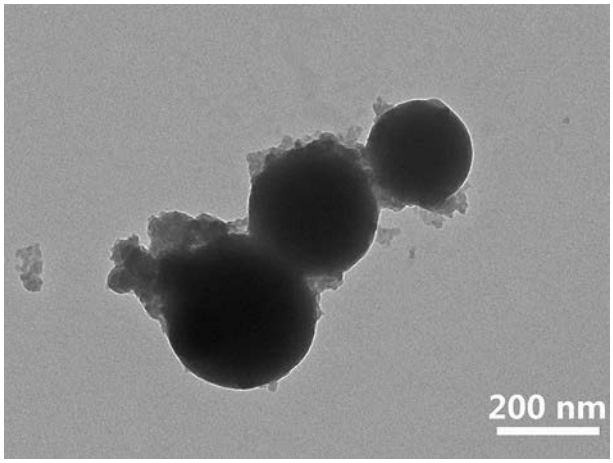

Fig. S4 TEM image of POM/[N-C_6, N′ -COOH-Im]Br hybrid materials after 7 days.

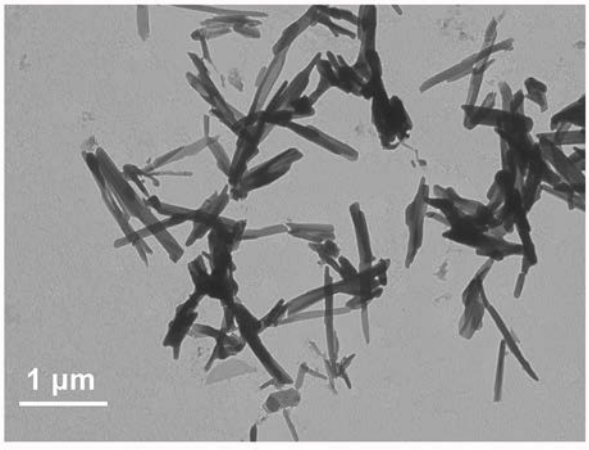

Fig. S5 TEM image of seeds for living self-assembly.

References

1. Y. Gong, Y. Guo, Q. Hu, C. Wang, L. Zang, L. Yu, pH-Responsive Polyoxometalate-Based Supramolecular Hybrid Nanomaterials and Application as Renewable Catalyst for Dyes, ACS. Sustain. Chem. Eng. 2017, 5, 3650-3658.