

Supporting Information

Chiral Arrangement of Achiral Au Nanoparticles by Supramolecular Assembly of Helical Nanofiber Templates

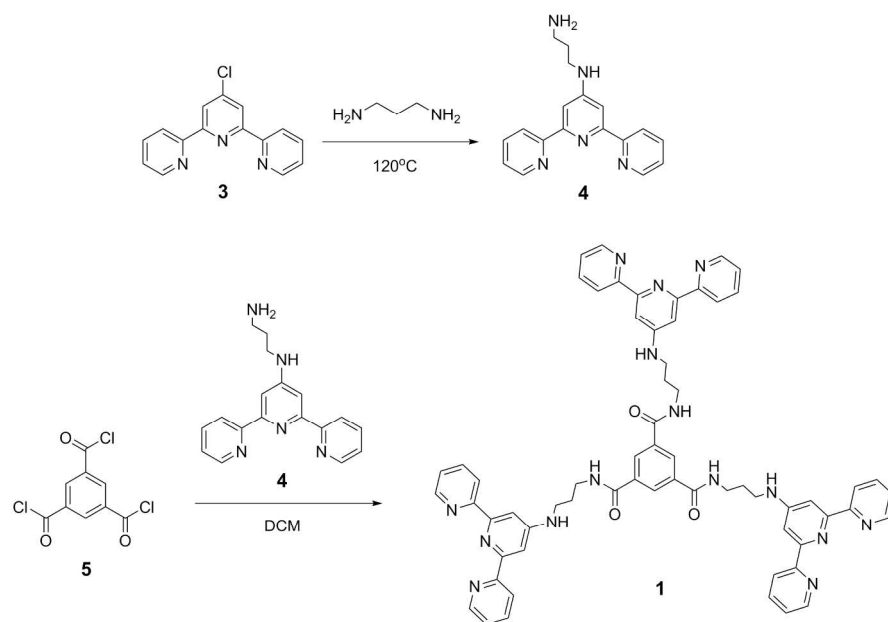
Sung Ho Jung,[†] Jiwon Jeon,[‡] Hyungjun Kim,^{‡*} Justyn Jaworski,^{||,⊥*} and Jong Hwa Jung^{† *}

[†] Dept. of Chemistry and Research Institute of Natural Sciences, Gyeongsang National University, Jinju, Korea. Fax: 055-758-6027; Tel: 055-772-1488; E-mail: jonghwa@gnu.ac.kr

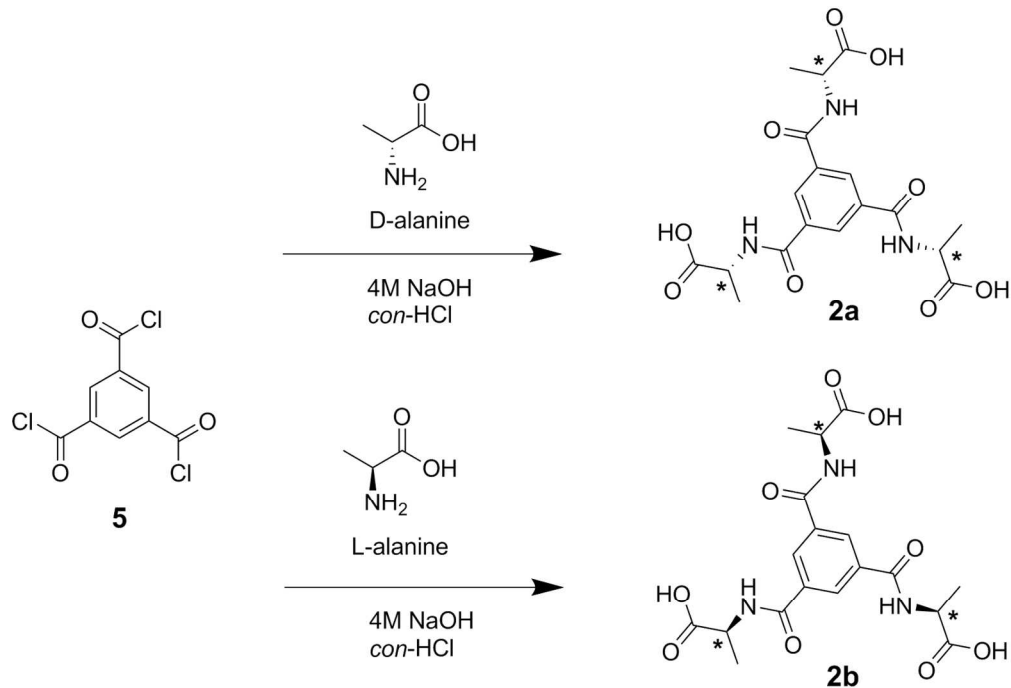
[‡] Graduate School of Energy, Environment, Water, and Sustainability (EEWS), Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea. Fax: 42-350-1710; Office: 42-350-1725; Email: linusi6@kaist.ac.kr

^{||} Dept. of Chemical Engineering, Hanyang University, Seoul, Korea. Fax: 02 2220 1935; Tel: 02 2220 2339; E-mail: justynj@hanyang.ac.kr

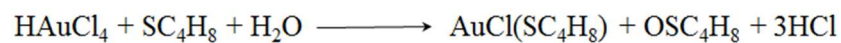
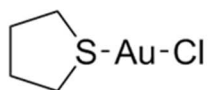
[⊥] Institute of Nano Science and Technology, 222 Wangsimni-ro, Seoul, Korea.



Scheme S1. Synthesis of terpyridine-based gelator **1**.



Scheme S2. Synthesis of **2a** and **2b**.



Scheme S3. Synthesis of chloro(tetrahydrothiophene) gold(I).

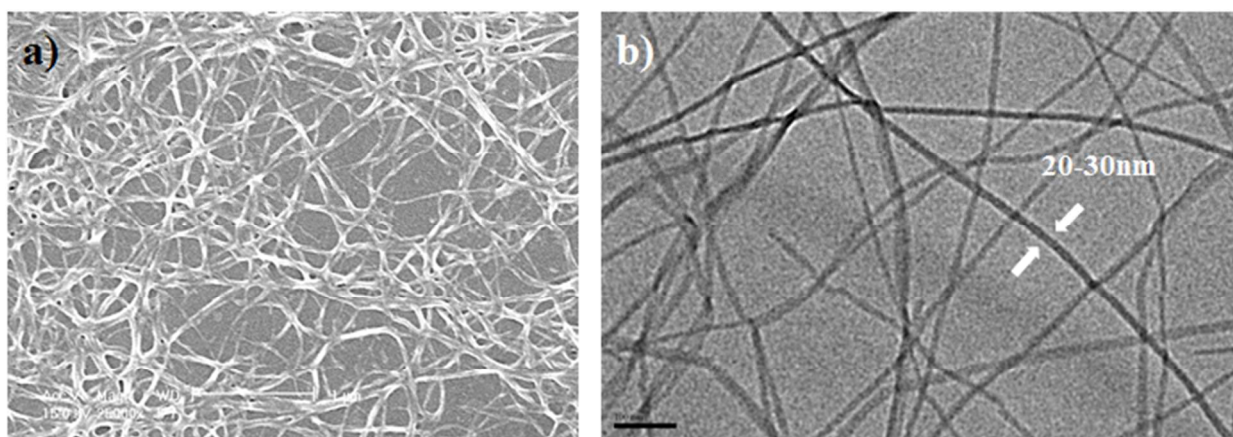


Figure S1. a) SEM and b) TEM images of hydrogel **1**.

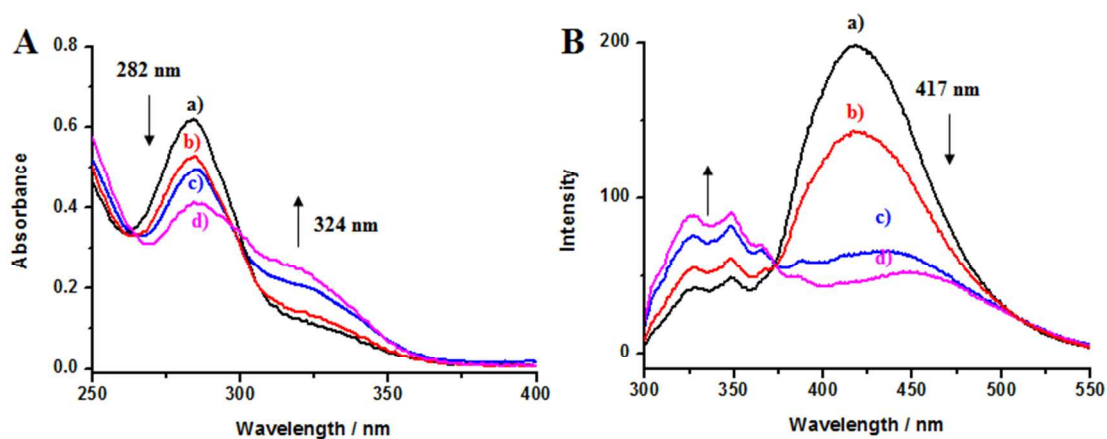


Figure S2. (A) UV/Vis and (B) fluorescence emission spectra of Hydrogel **1** without (a) **2b** and with (b) 0.5 equiv., (c) 1.0 equiv., and (d) 2.0 equiv. of **2b** in DMSO/water.

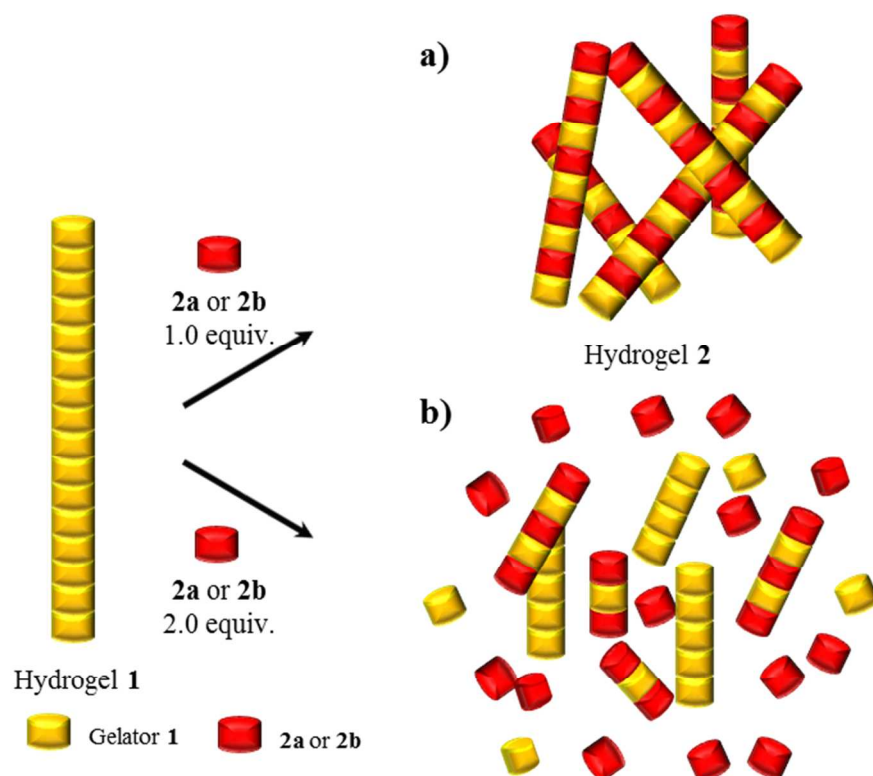


Figure S3. Illustrative representation of the gelation process in hydrogel 2 with (a) 1.0 equivalent or (b) 2.0 equivalent of **2a** or **2b**.

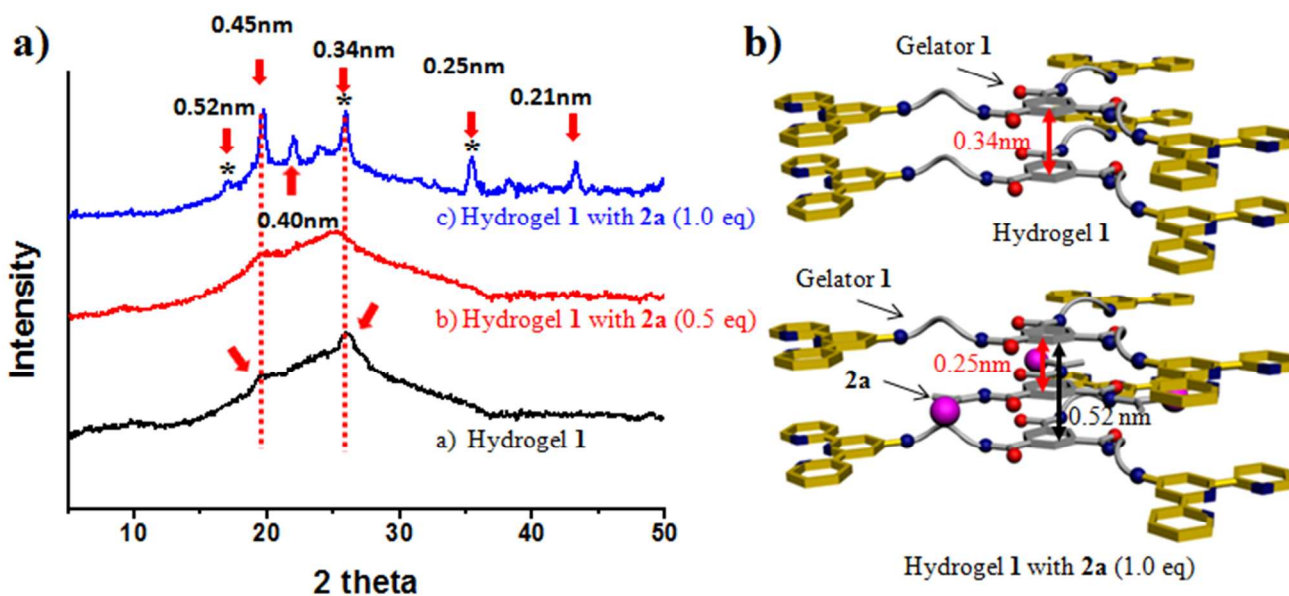


Figure S4. a) Powder X-ray diffraction analysis of hydrogel 1 containing 0, 0.5, or 1 equiv. of **2a**. b) Predicted structural model of the assembled nanofibers of Gel 1 (top) and Gel 1 with **2a** (bottom).

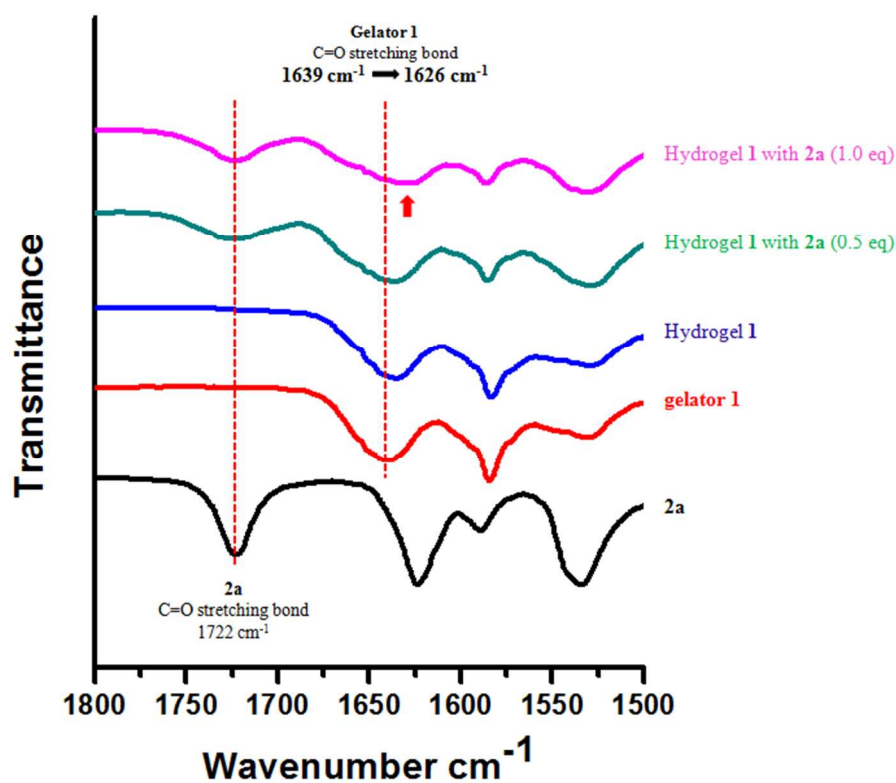


Figure S5. IR spectra of gelator **1** before and after mixture with various amounts of **2a**.

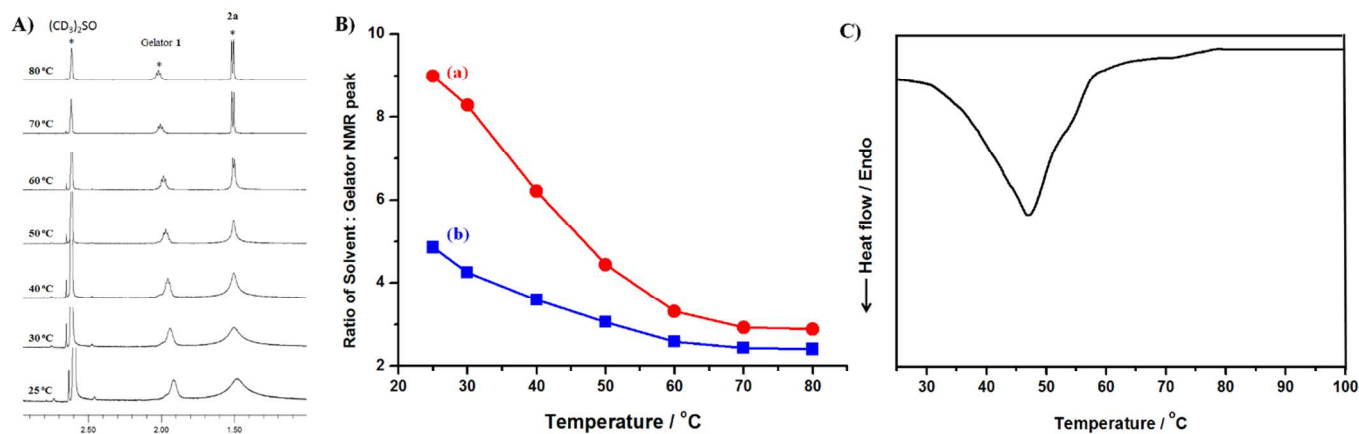


Figure S6. (A) Variable temperature (VT) ^1H NMR spectra of hydrogel **1** with **2a** (1.0 equiv.) as temperature decreases. (B) VT ^1H NMR experiment demonstrating the immobilization of hydrogel **1** with **2a** as temperature decreases; (a) circles represent data for ethyl- of gelator **1** (0.1 mol) in hydrogel, (b) squares represent data for methyl- of **2a** (1.0 equiv.) in hydrogel. (C) DSC thermogram of the hydrogel **1** with **2a** (1.0 equiv.).

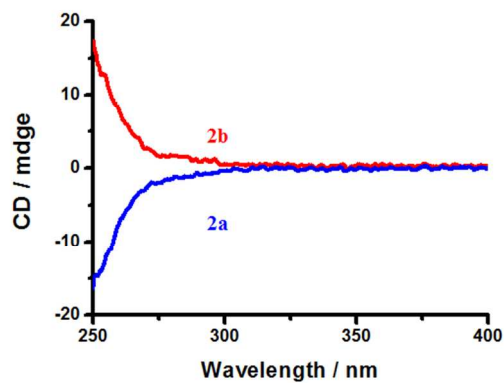


Figure S7. CD spectroscopy of individual enantiomers of D-form (blue CD signal) **2a** and L-form (red CD signal) **2b**.

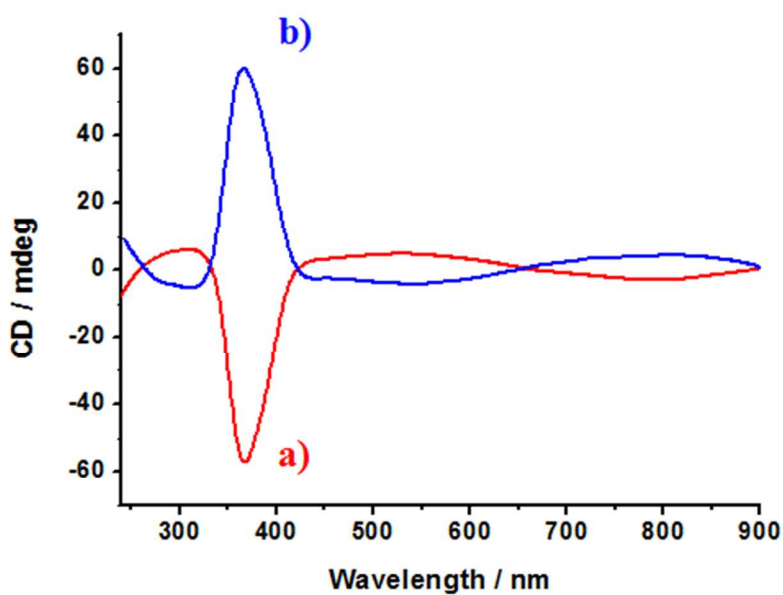


Figure S8. CD spectra of hydrogel **1** containing 1 equiv. of a) **2a** (D-form) or b) **2b** (L-form) and 3 molar equivalents of Au(I) ions after UV irradiation.

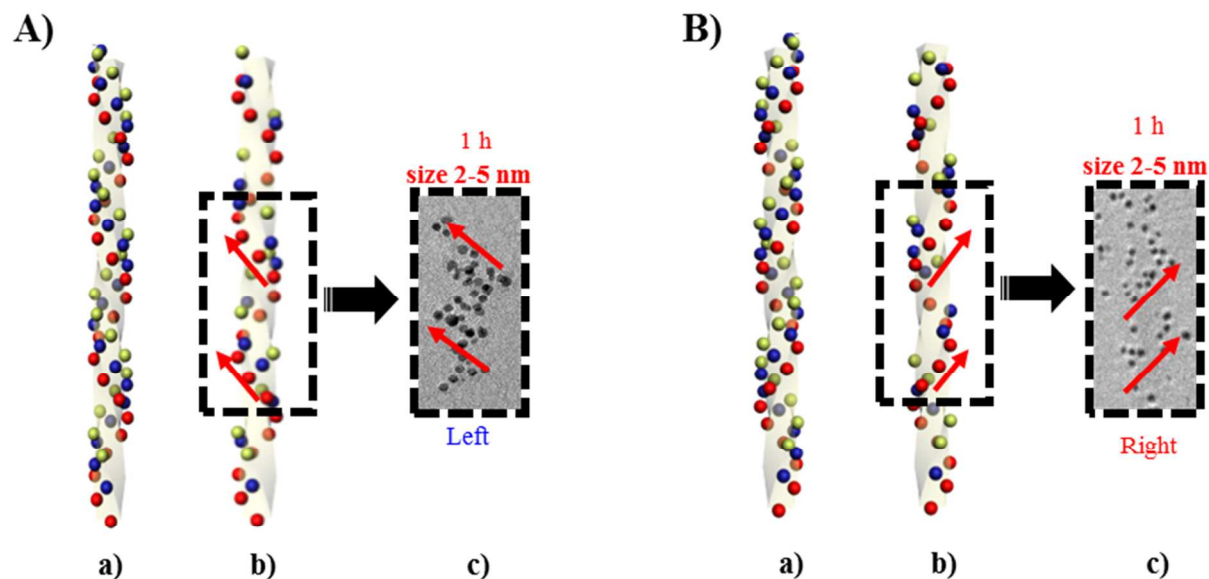


Figure S9. Illustrative representation of the A) left and B) right-handed arrangement of nanoparticles on the helical organic nanofibers. a) The ideal arrangement of gold nanoparticles and b) the potential arrangement of gold nanoparticles after some loss during sample preparation for TEM are presented as three different helical pathways: red, blue and green colors. c) Actual TEM image of the gold nanoparticles arranged on the helical organic nanofiber.

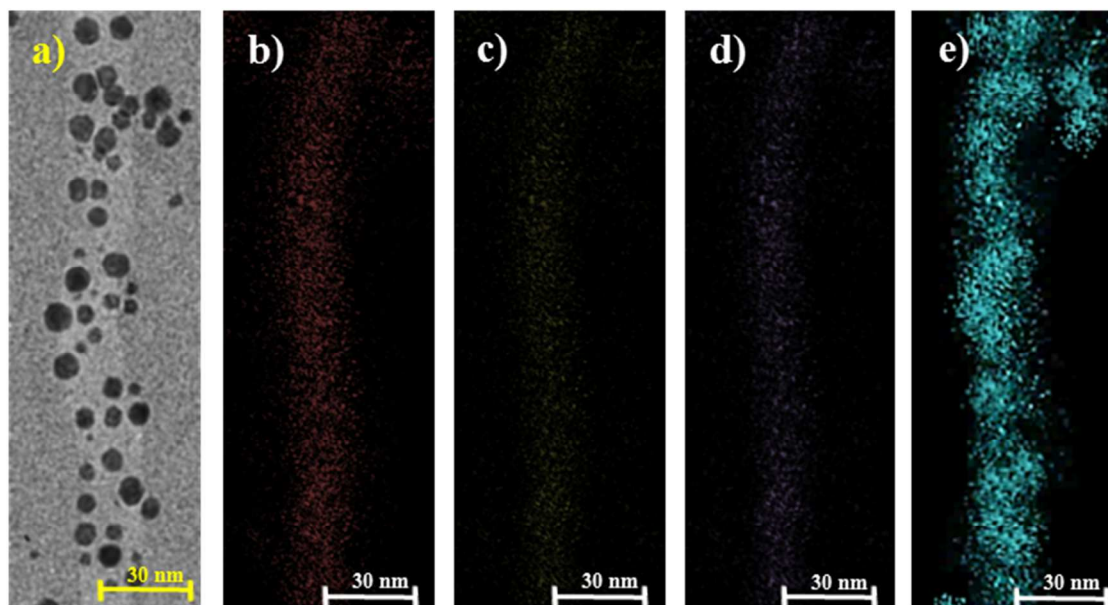
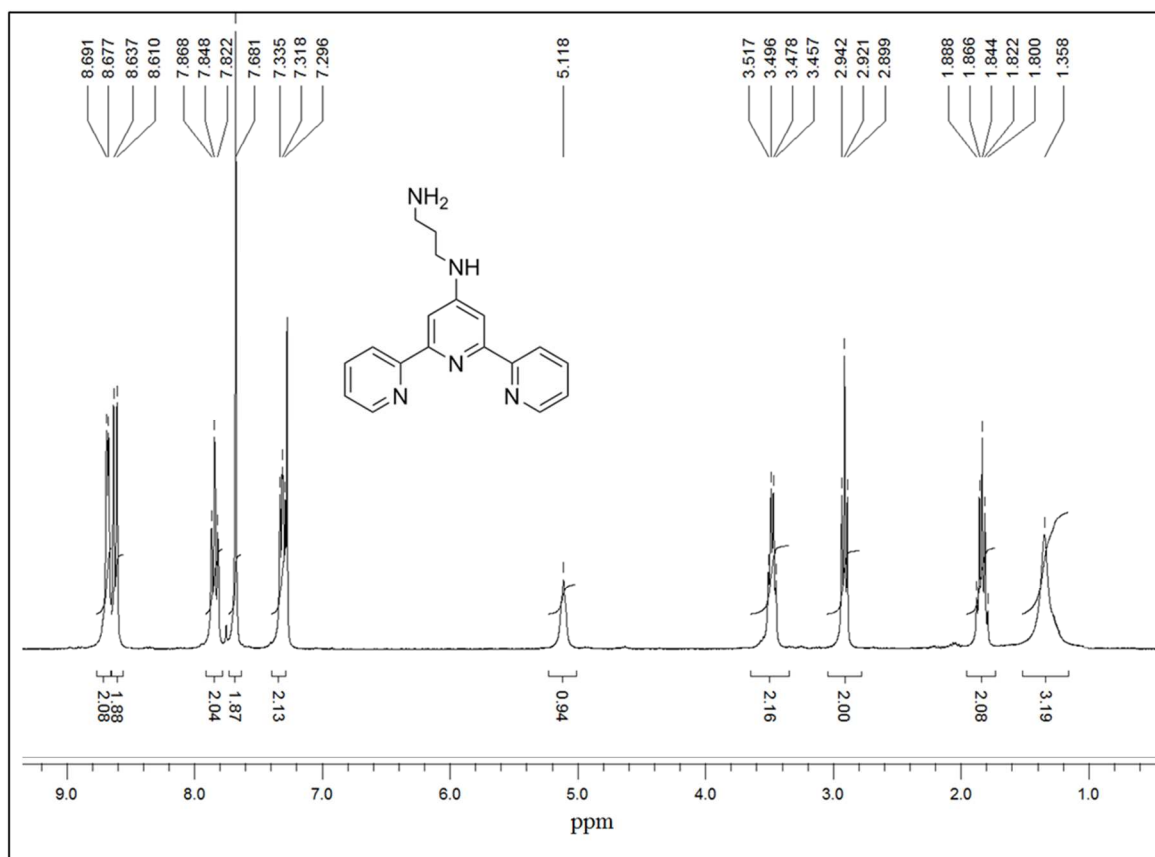


Figure S10. a) TEM image of a nanoparticle superstructure derived from hydrogel **1** containing 1 equiv. of **2a** (D-form) and 3 molar equivalents of Au(I) ions after UV irradiation for 3h. Elemental mapping images of (b) C, (c) N, (d) O and (e) Au reveal the co-localized presence of the organic nanofiber as well as the presence of gold.

a)



b)

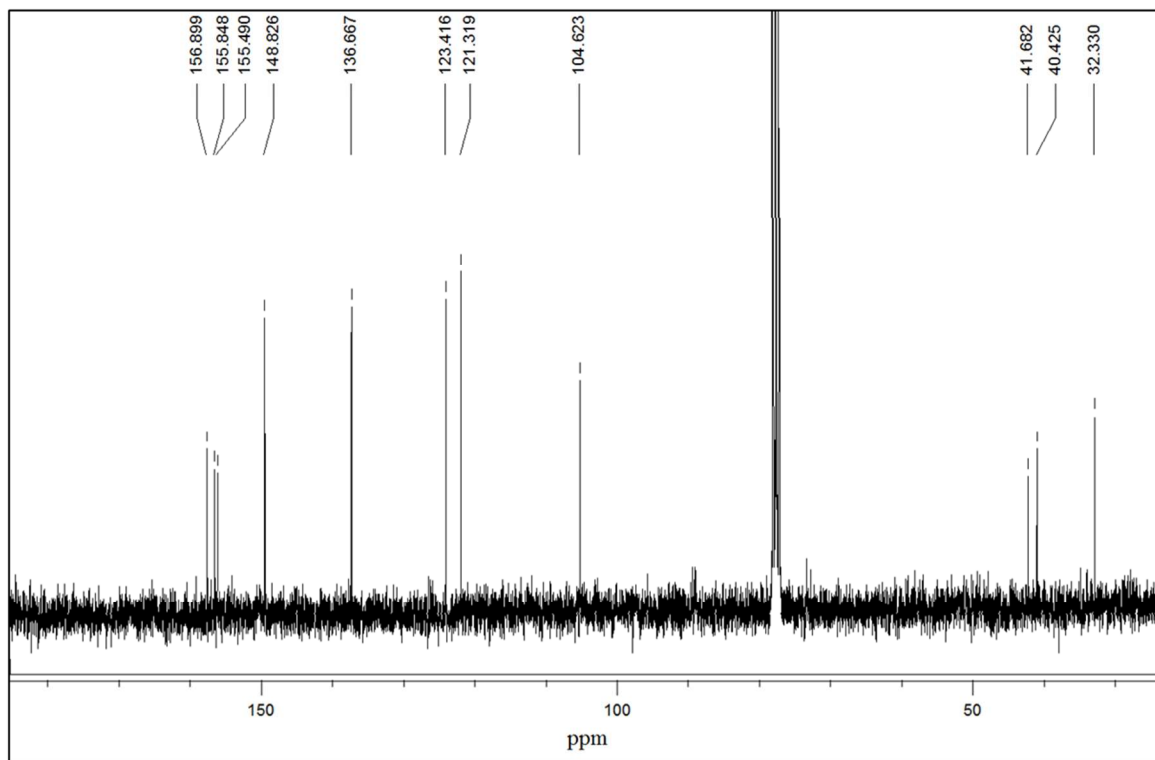


Figure S11. a) ¹H NMR spectrum of **4** (300 MHz, CDCl₃). b) ¹³C NMR spectrum of **4** (125 MHz, CDCl₃).

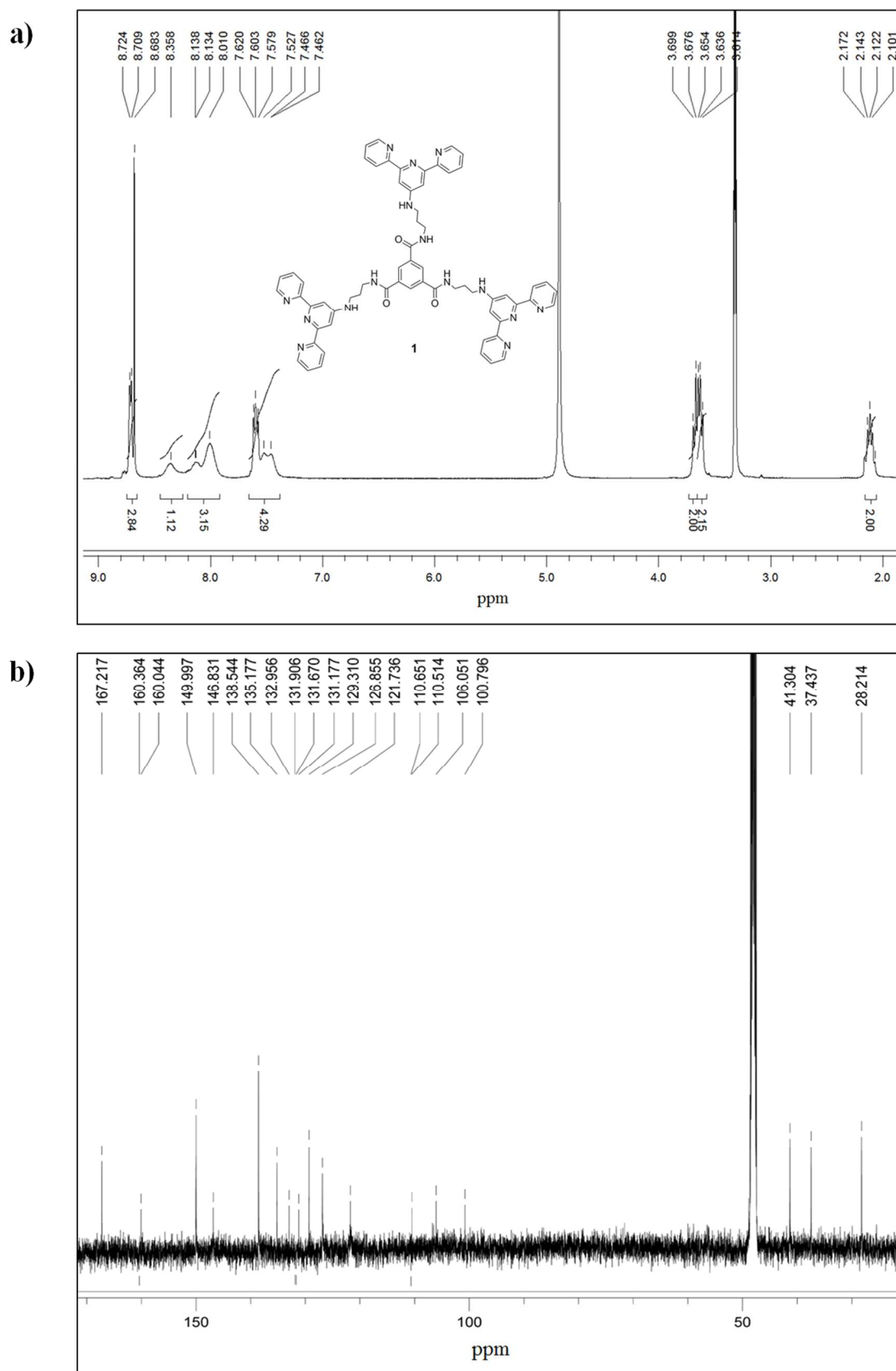


Figure S12. a) ¹H NMR spectrum of **1** (300 MHz, CD₃OD). b) ¹³C NMR spectrum of **1** (125 MHz, CD₃OD).

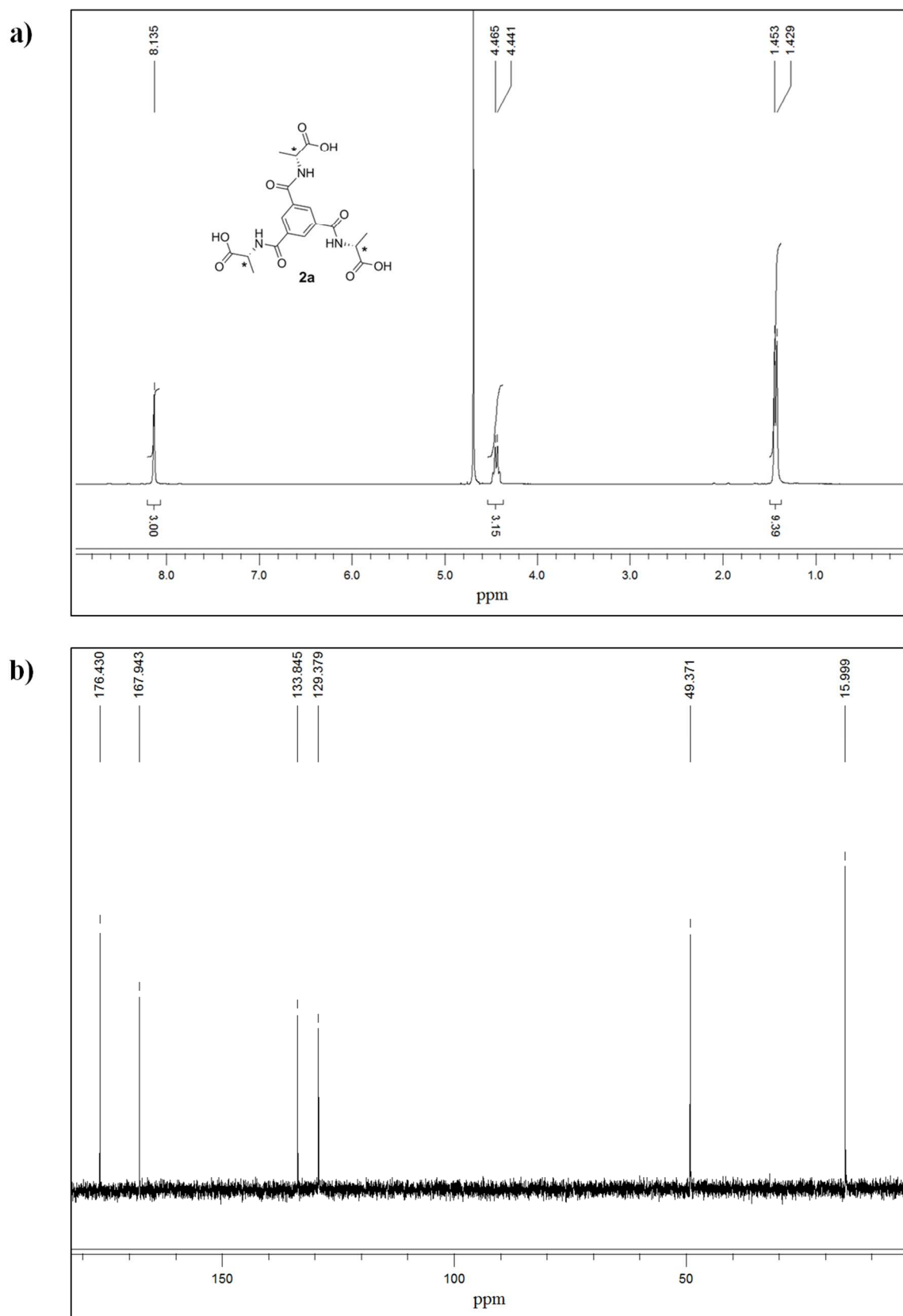


Figure S13. a) ¹H NMR spectrum of **2a** (300 MHz, D₂O). b) ¹³C NMR spectrum of **2a** (125 MHz, D₂O).