Supporting information

Hydrogen Bonding and Phase Separation Cooperatively Guide the Self-assembly of U60 and Polymer to Fabricate Multiscale Nanostructures

Jie Hu*, Yingxuan Mei, Huifen Wu, Yan Zhao, Dongping Wu, Nan Ye, Peng Yi, Yu Yang, Minmeng Liao

School of Mechatronics and New Energy Vehicles，Yichun Vocational Technical College College , Yichun 336000, China.

*Email address: hujie2040@163.com

Materials and Methods

DLS measures the intensity−intensity time correlation function by means of a BI-9000AT multichannel digital correlator. The field correlation function $|g^{(1)}(\tau)|$ was analyzed by the constrained regularized CONTIN method to yield information on the distribution of the characteristic line width Γ from $|g^{(1)}(\tau)| = \int G(\Gamma)\, e^{-\Gamma\tau}\, d(\Gamma)$.The normalized distribution function of the characteristic line width, $G(\Gamma)$, so obtained, can be used to determine an average apparent translational diffusion coefficient, $D_{app} = \Gamma/q^2$. The hydrodynamic radius R_h is related to D via the Stokes−Einstein equation:$R_h = kT/(6\pi\eta D)$ where k is the Boltzmann constant and η the viscosity of the solvent at temperature T. From DLS measurements, we can obtain the particle-size distribution in solution from a plot of $\Gamma G(\Gamma)$ vs R_h. The R_h of the particles is obtained by extrapolating Rh,app to zero scattering angle.

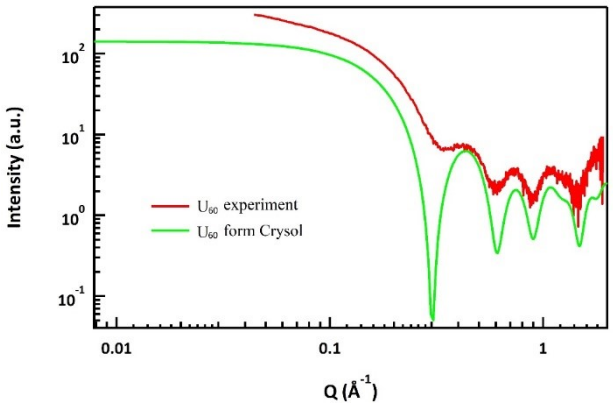

Fig. S1 SAXS data of U60.

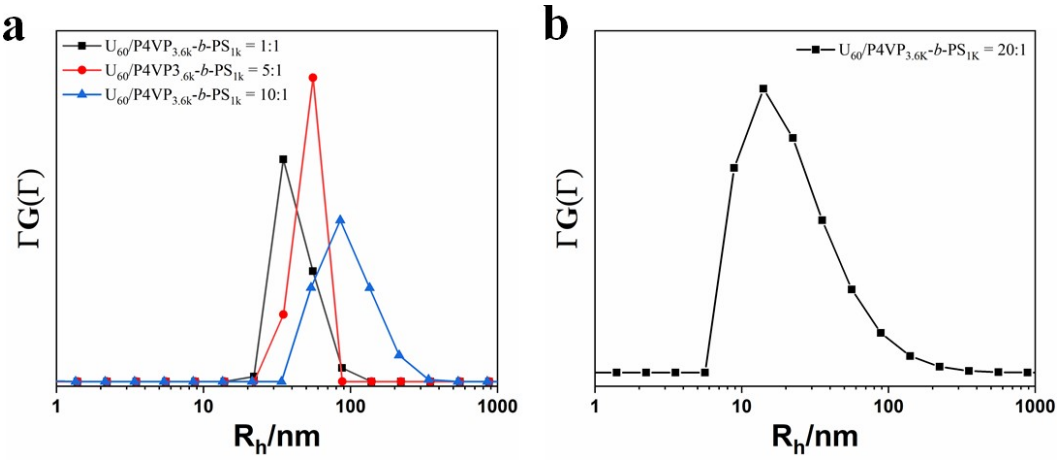

Fig. S2 (a) and (b) U_{60} and P4VP$_{3.6k}$-*b*-PS$_{1k}$ form a complex aqueous solution DLS analysis diagram (the molar ratio of U_{60} and P4VP$_{3.6k}$-*b*-PS$_{1k}$ are 1:1, 5:1, 10:1 and 20:1).

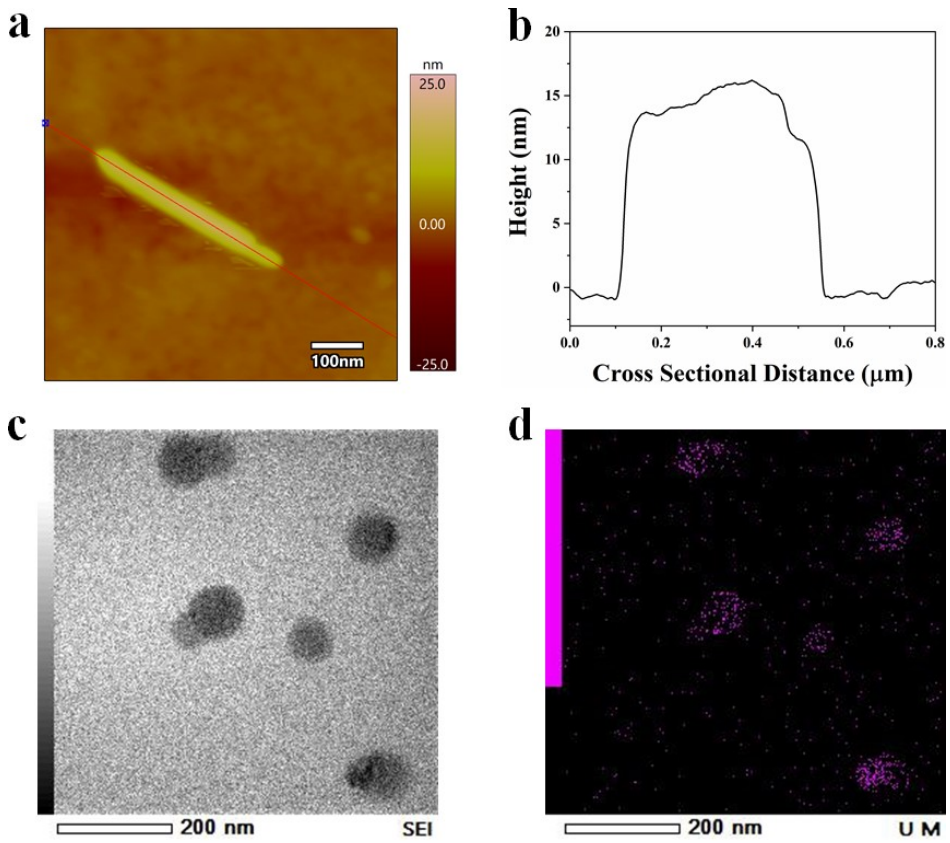

Fig. S3 (a) AFM image of U_{60}/P4VP$_{3.6k}$-*b*-PS$_{1k}$ wormlike composite. (b) Corresponds to the height of the compound in (a). (c) TEM image of U_{60}/P4VP$_{3.6k}$-*b*-PS$_{1k}$ composite (the molar ratio of U_{60} and P4VP$_{3.6k}$-*b*-PS$_{1k}$ is 1:1). (d) Corresponds to the distribution of U elements in (c).

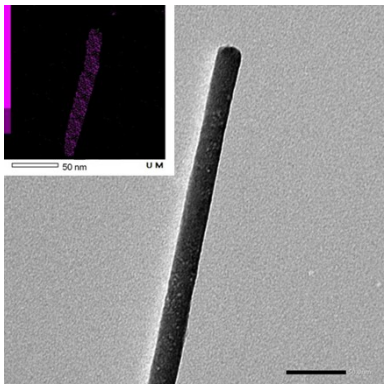

Fig. S4 TEM images of U_{60}/P4VP$_{3.6k}$-*b*-PS$_{1k}$ wormlike composite, the inset is the distribution diagram of U.

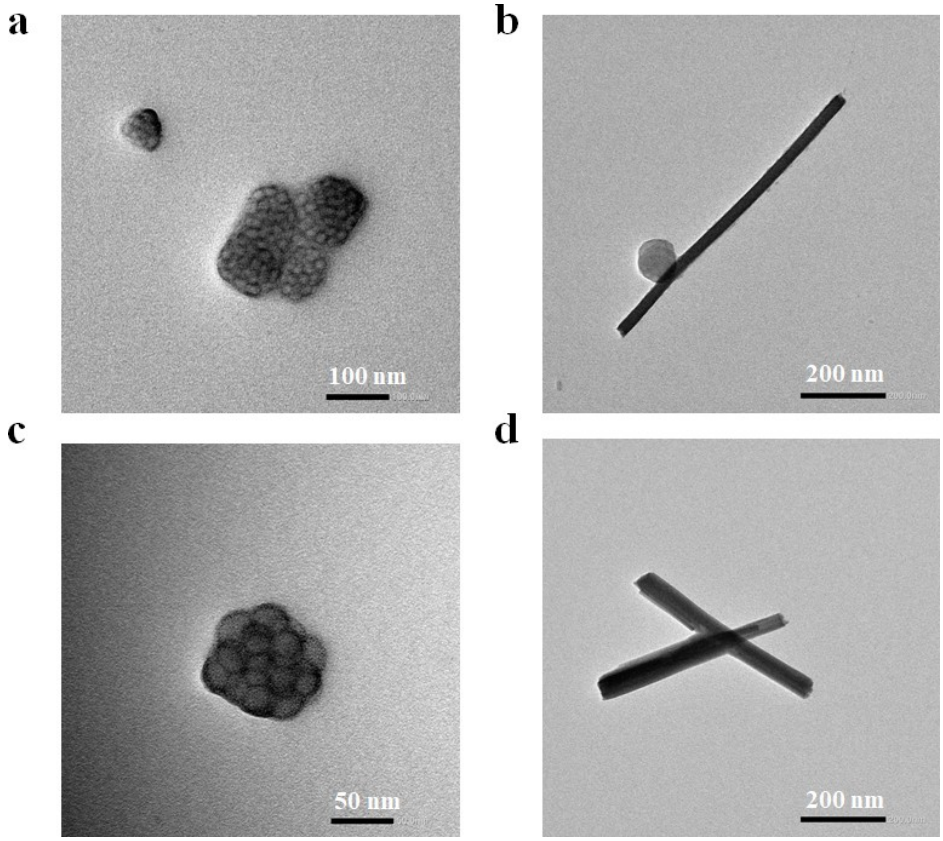

Fig. S5 (a) and (b) TEM image of U_{60}/P4VP$_{3.6k}$-*b*-PS$_{3.1k}$ composite (the molar ratio of U_{60} and P4VP$_{3.6k}$-*b*-PS$_{3.1k}$ is 1:1 and 10:1 respectively). (e) and (f) TEM image of U_{60}/P4VP$_{3.6k}$-*b*-PS$_{5.1k}$ composite (the molar ratio of U_{60} and P4VP$_{3.6k}$-*b*-PS$_{5.1k}$ is 1:1 and 10:1 respectively).

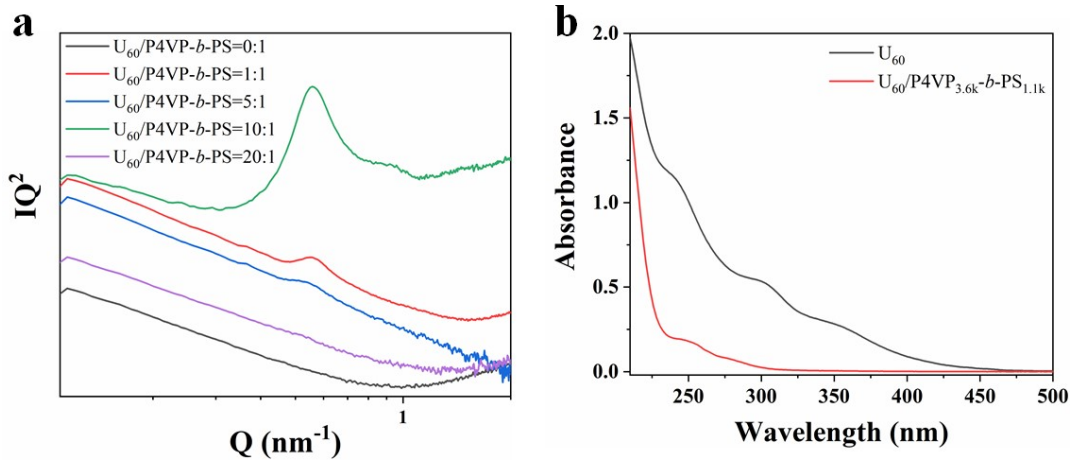

Fig. S6 (a) U_{60}/P4VP$_{3.6k}$-*b*-PS$_{1k}$ SAXS images with different molar ratios. (b) The UV spectrum of the sample supernatant after P4VP$_{3.6\,k}$-*b*-PS$_{1.1\,k}$ and U_{60} were assembled and adsorbed one month later.