Supporting Information

Solvent Dielectricity-Modulated Helical Assembly and Morphologic Transformation of Achiral Surfactant-Inorganic Cluster Ionic Complexes

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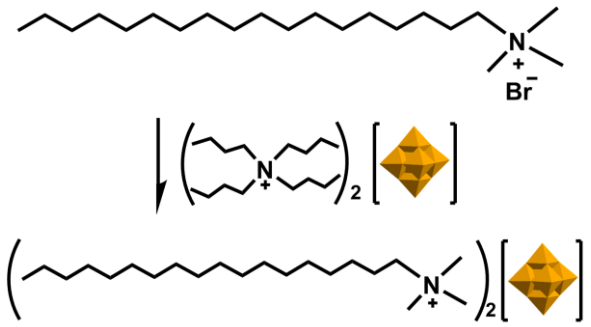

Figure S1. Synthesis route of $(ODTA)_2[Mo_6O_{19}]$.

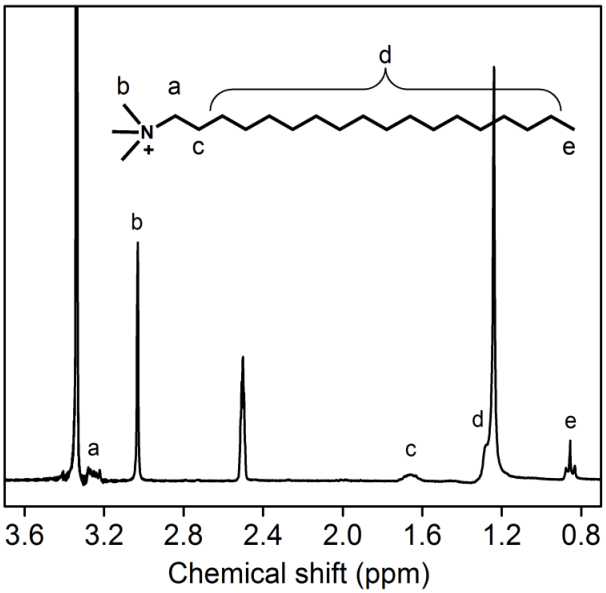

Figure S2. ^1H NMR spectrum of $(ODTA)_2[Mo_6O_{19}]$ in DMSO-d_6.

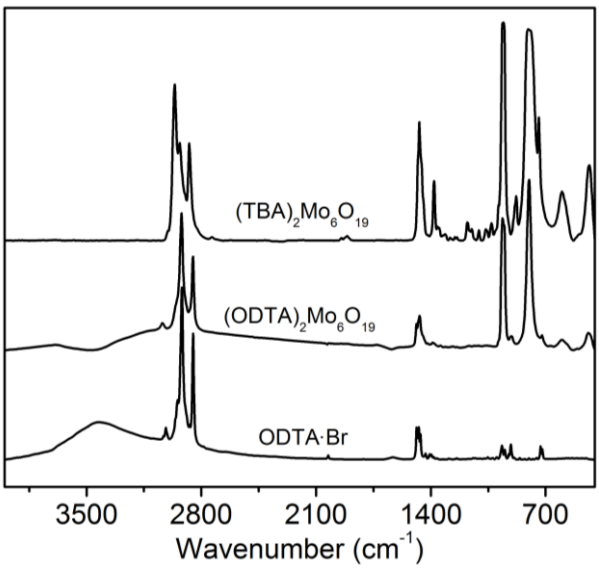

Figure S3. FT-IR spectra of $(TBA)_2[Mo_6O_{19}]$, $(ODTA)_2[Mo_6O_{19}]$, and ODTA·Br.

Table S1. Assignments of characteristic infrared spectra of $(TBA)_2[Mo_6O_{19}]$, $(ODTA)_2[Mo_6O_{19}]$, and ODTA·Br.

$(TBA)_2[Mo_6O_{19}]$ (cm^{-1})	$(ODTA)_2[Mo_6O_{19}]$ (cm^{-1})	ODTA·Br (cm^{-1})	Assignments[a]
	3030	3433	O–H asymmetrical stretching
2962	2954	2956	CH_3 asymmetrical stretching
2931	2920	2918	CH_2 asymmetrical stretching
2873	2850	2850	CH_2 symmetrical stretching
	1485		CH_2–N^+ scissoring
1468	1467	1467	CH_2 scissoring
1378	1388		CH_3 scissoring
956	962		ν_{as}(Mo–O_t)
798	802		ν_{as}(Mo–O_b)
597	605		δ(O_b–Mo–O_t)
438	439		δ(O_b–Mo–O_t)

Table S2. Elemental analysis for $(ODTA)_2[Mo_6O_{19}]$.

Sample		C/%	H/%	N/%
$(ODTA)_2[Mo_6O_{19}]$	Found	33.47	6.09	1.82
	Calcd.	33.52	6.16	1.86

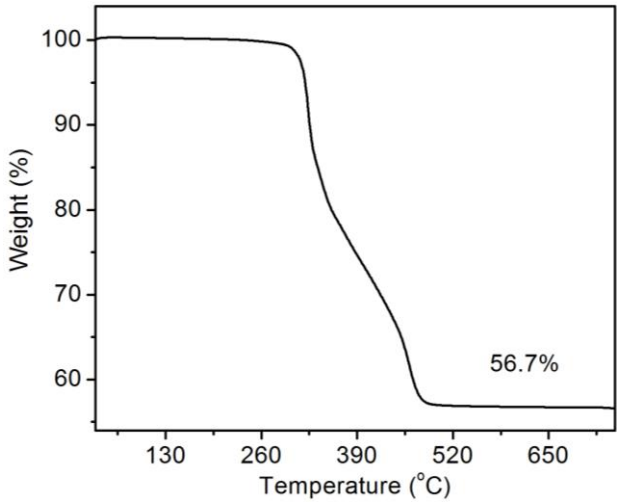

Figure S4. TGA curve of $(ODTA)_2[Mo_6O_{19}]$ carried out in air, the measured residue of 56.7% at 700 °C is in agreement with the calculated value of 57.4% from the given formula $C_{42}H_{92}N_2Mo_6O_{19}$.

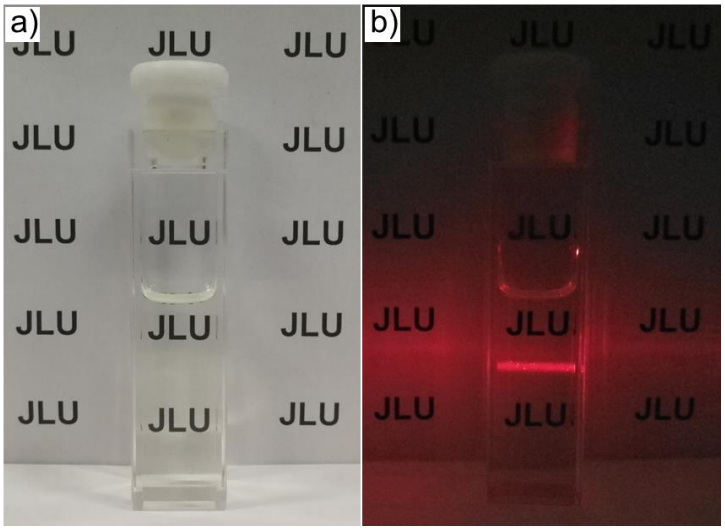

Figure S5. (a) Digital photo and (b) corresponding Tyndall scattering observation of $(DODA)_2[Mo_6O_{19}]$ in the solution of dichloromethane/methanol (30:1 in v/v) at concentration of 1.0 mg mL^{-1}.

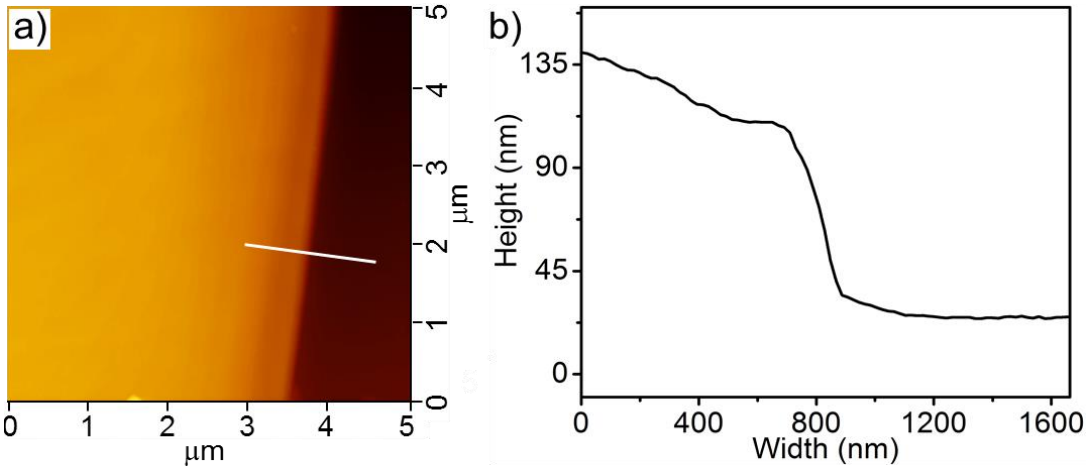

Figure S6. (a) AFM image and (b) the corresponding height profile of $(DODA)_2[Mo_6O_{19}]$ self-assemblies in dichloromethane.

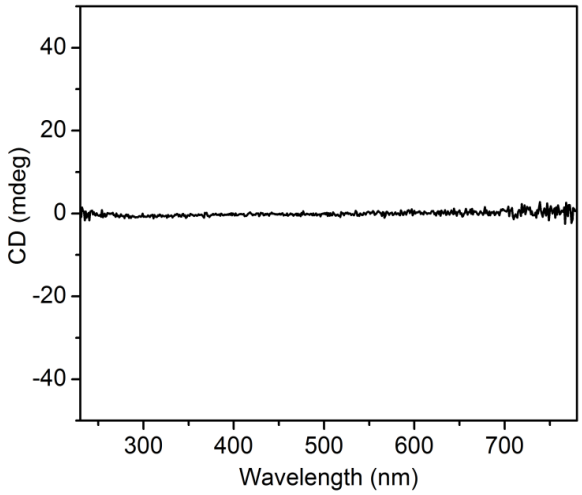

Figure S7. CD spectrum of $(DODA)_2[Mo_6O_{19}]$ casting film on quartz substrate obtained from dichloromethane/methanol (30:1 v/v).

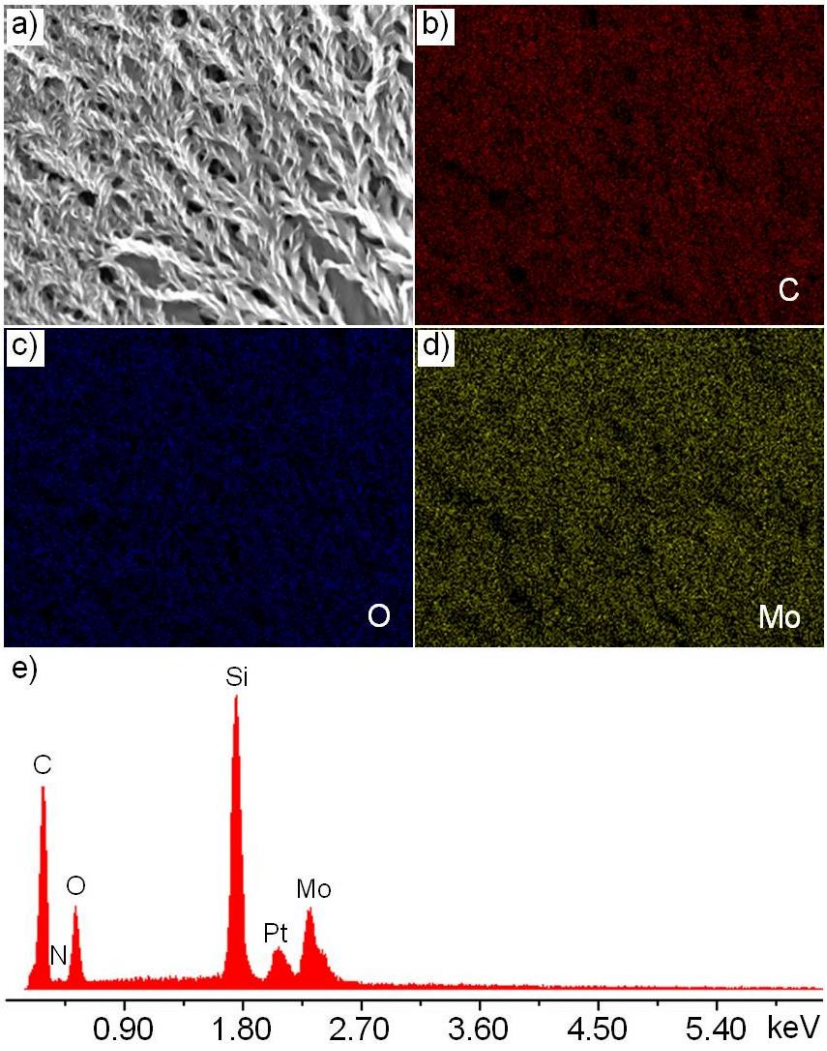

Figure S8. (a) HAADF-STEM image of the helical assemblies of $(DODA)_2[Mo_6O_{19}]$ on silica substrate;(b), (c) and (d) the EDX-mapping image of C, O and Mo element distribution marked as red, blue and yellow dots, respectively; (e) the binding energy spectrum of the region of image (a). Conductive coating: platinum ultrathin coating of electrically-conducting material, deposited by low vacuum sputter coating of the sample.

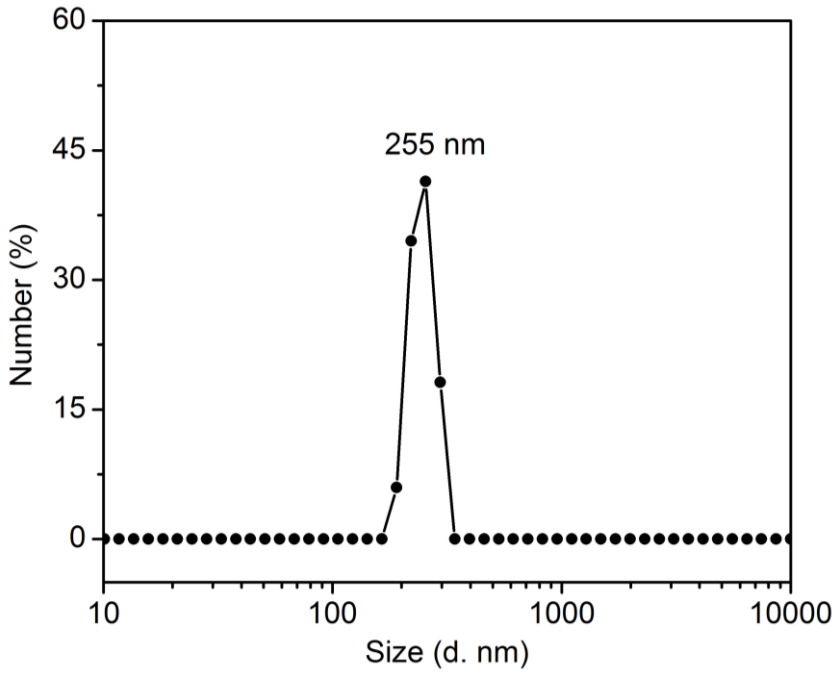

Figure S9. DLS of $(DODA)_2[Mo_6O_{19}]$ in the solution of dichloromethane/methanol (30:1 in v/v) with concentration 1.0 mg mL^{-1}.

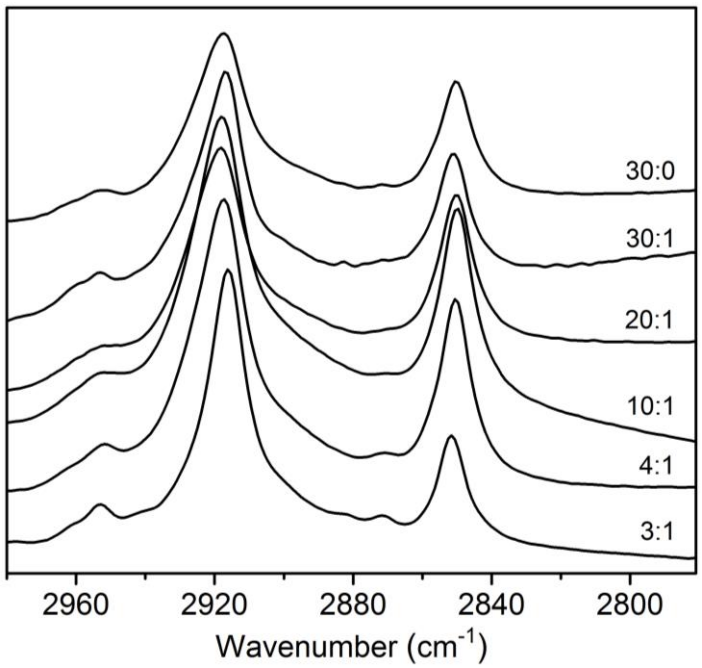

Figure S10. FT-IR spectra of $(DODA)_2[Mo_6O_{19}]$ in the mixed solvent CH_2Cl_2 and CH_3OH with different volume ratios.

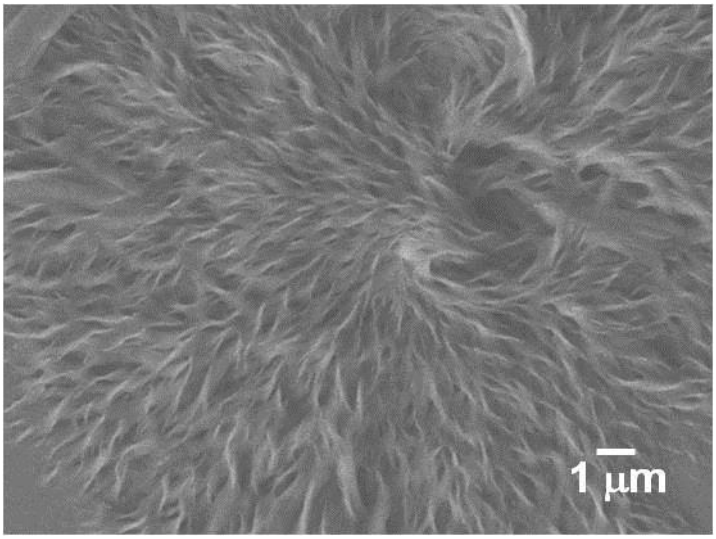

Figure S11. SEM image of the helical assembly of $(DODA)_2[Mo_6O_{19}]$ in dichloromethane/methanol (20:1) solution at 30 ºC with the concentration of 1 mg mL^{-1}.

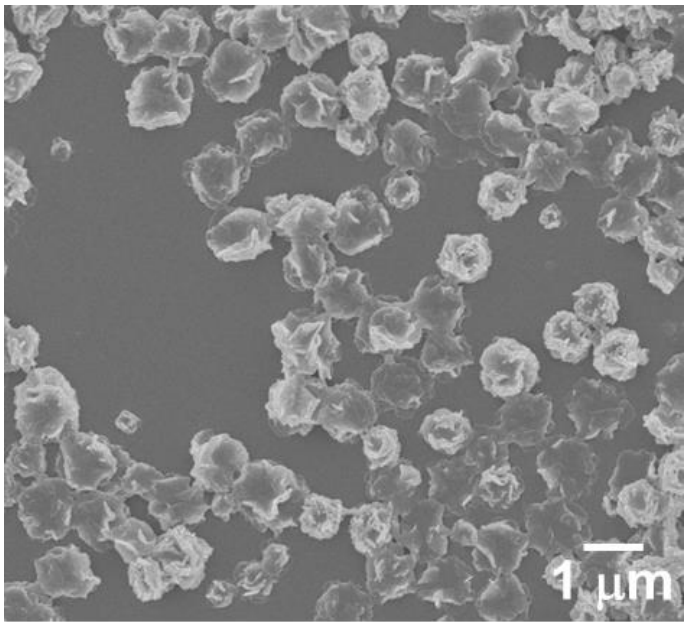

Figure S12. SEM image of $(DODA)_2[Mo_6O_{19}]$ for the immediate state after sonication for 5 min, aging for 5 min, in dichloromethane/methanol (4:1 v/v) solution at 30 ºC with the concentration of 1 mg mL^{-1}.

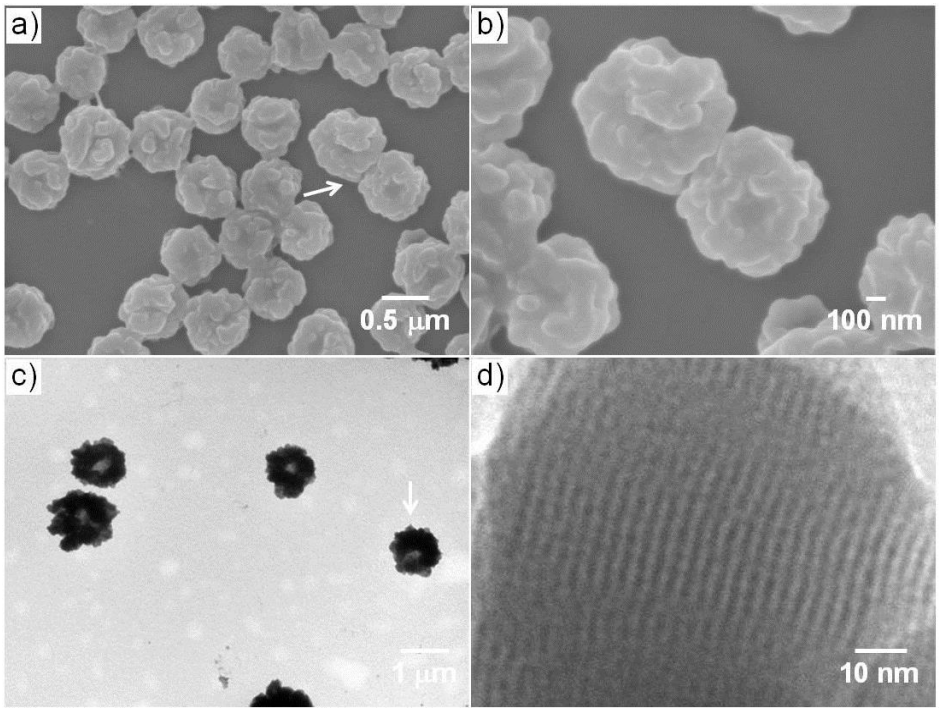

Figure S13. (a) SEM and (c) TEM images of $(DODA)_2[Mo_6O_{19}]$ in dichloromethane/methanol (3:1 v/v) solution at 30 °C with the concentration of 1 mg mL^{-1}. Magnified (b) SEM and (d) TEM images of the area marked in (a) and (c).

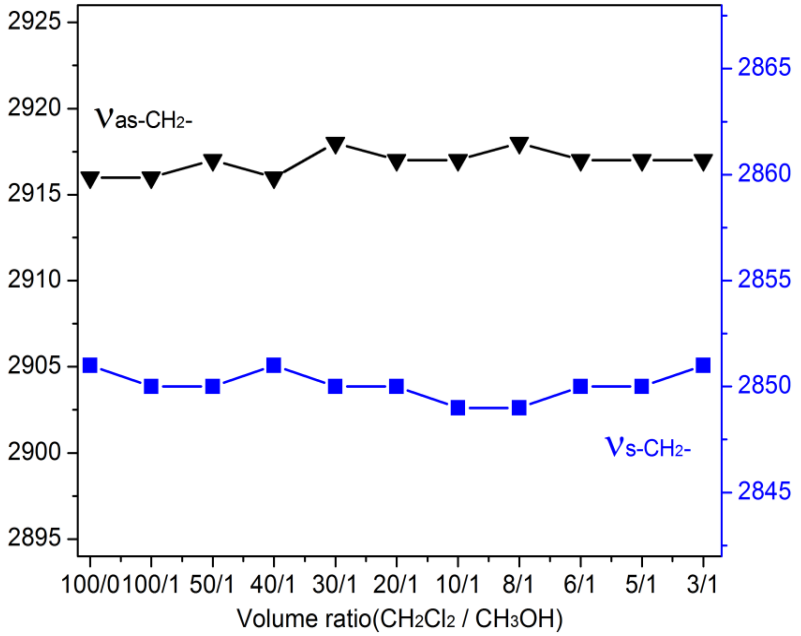

Figure S14. Solvent dependence of the positions of antisymmetric and symmetric CH_2 stretching mode of $(DODA)_2[Mo_6O_{19}]$.