Electronic Supplementary Material (ESI) for Soft Matter


# Supporting Information

## Smectic Polymer Micellar Aggregates with Temperature-Controlled Morphologies

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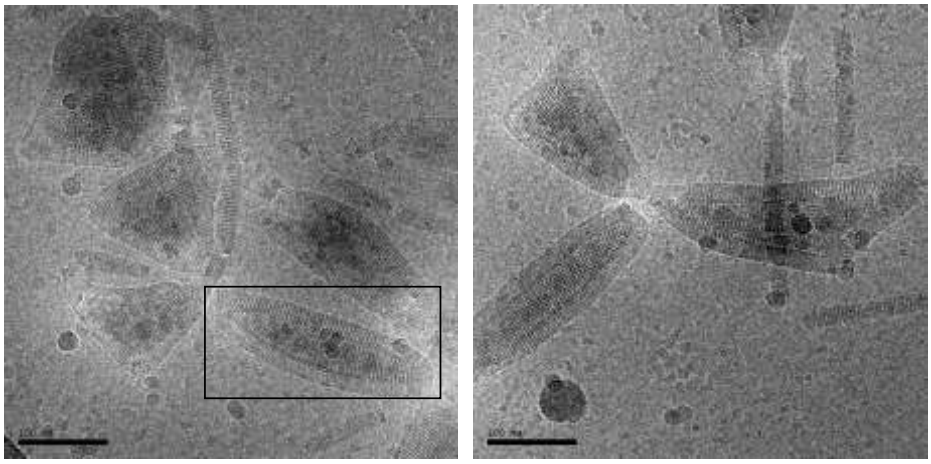
**Supplemental Tables and Figures**

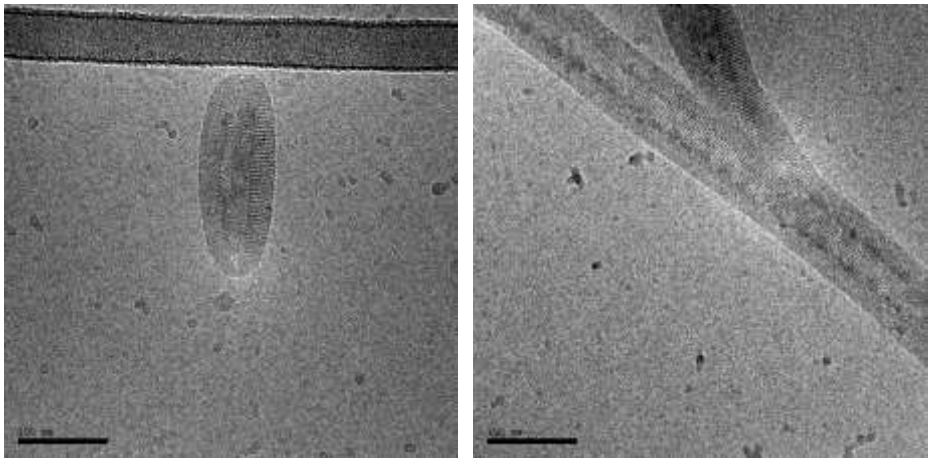
Table SI-1. Sizes and morphologies of aggregates formed by $PEG_{114}$-*b*-$PAChol_{60}$ and $PEG_{45}$-*b*-$PAChol_{16}$ in dioxane/water mixture characterized by TEM with negative staining and cryo-TEM

| Sample | Morphologies and Sizes (nm) [a] | | | |
|---|---|---|---|---|
| | 5 °C | 25 °C | 40 °C | 55 °C |
| $PEG_{114}$-*b*-$PAChol_{60}$ by cryo-TEM | Nanofibers<br>e = 17~24<br>L = 100~1000 | Nanofibers:<br>e = 17~24<br>Ellipsoidal vesicles:<br>e = 17~24<br>d1 = 50~100<br>d2 = 150~400 | Nanotubes:<br>e = 24~29<br>d = 61~88,<br>L = 100~3000 | Condensed vesicles<br>d = 65~115 |
| $PEG_{45}$-*b*-$PAChol_{16}$ by TEM | Nanofibers<br>D ≈ 20~35<br>L>800 | Ellipsoidal vesicles<br>D1 ≈ 100~210<br>D2 ≈ 300~500 | Vesicles<br>D ≈ 100~250 | Vesicles<br>D ≈ 50~100 |

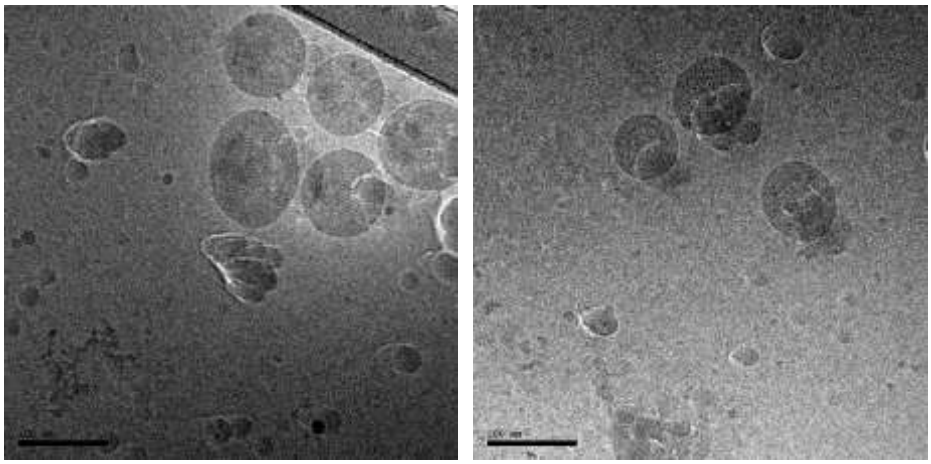
[a] e is the hydrophobic diameter (or thickness) of nanofibers (or vesicles), d is the diameter of tubes or vesicles without hydrophilic shell (d1 for the diameter of ellipsoidal vesicle in short axis, and d2 the diameter of ellipsoidal vesicle in long axis) and L the length of nanofibers or nanotubes. D is the estimation of the diameters of nanotubes or vesicles including hydrophilic shell according to TEM with negative staining.



**a.**



**b.**



**c.**

Fig. SI-1 Cryo-TEM images of $PEG_{114}$-b-$PAChol_{60}$(14/86) self-assemblies obtained at **a.** 25°C ,**b.** 40°C, **c.** 55°C.

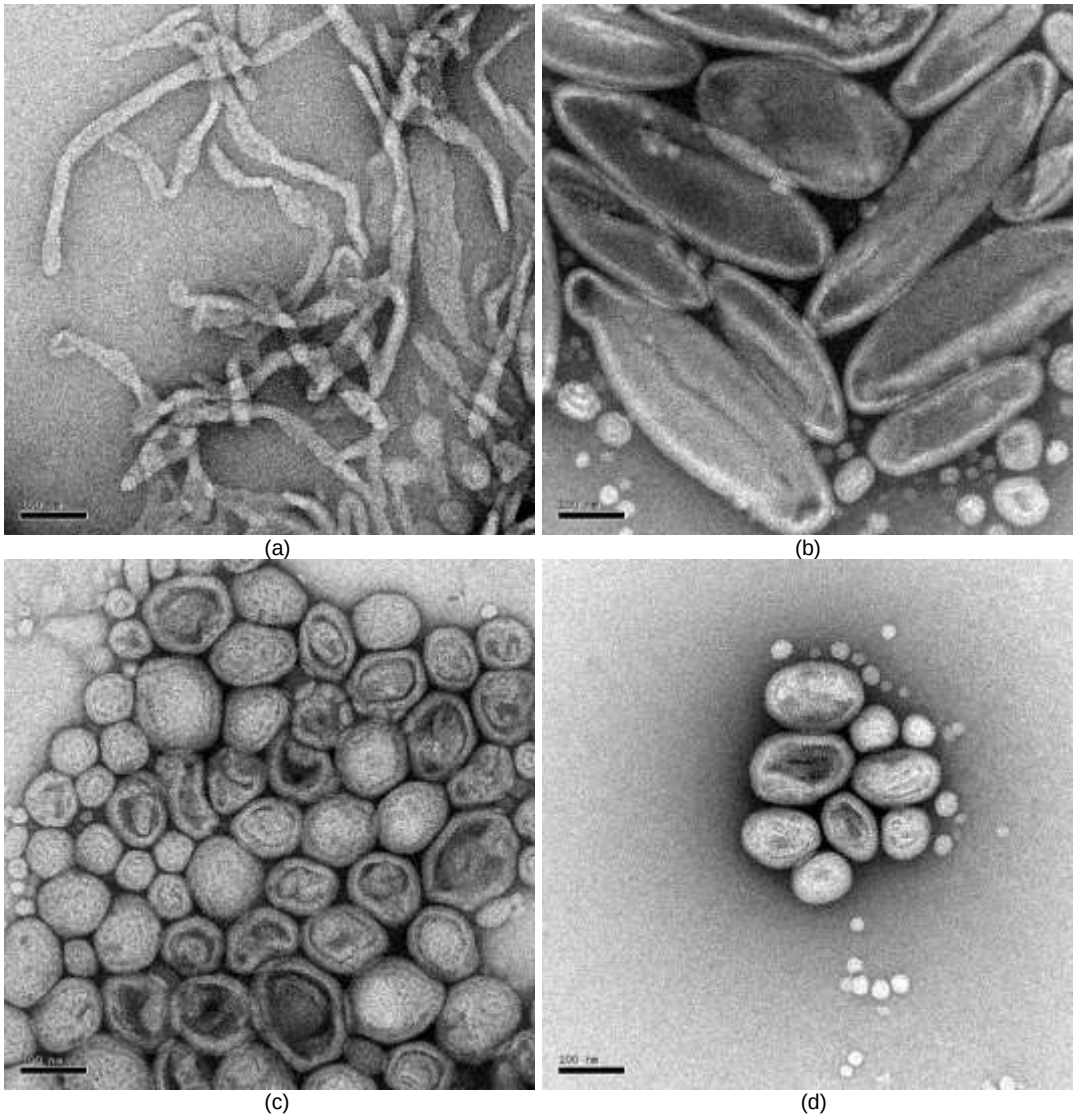



Fig. SI-2 TEM images of PEG45-b-PAChol16 self-assemblies obtained in water at different temperatures. (a) 5°C; (b) 25°C; (c) 40°C; (d) 55°C. Scale bar = 100 nm.

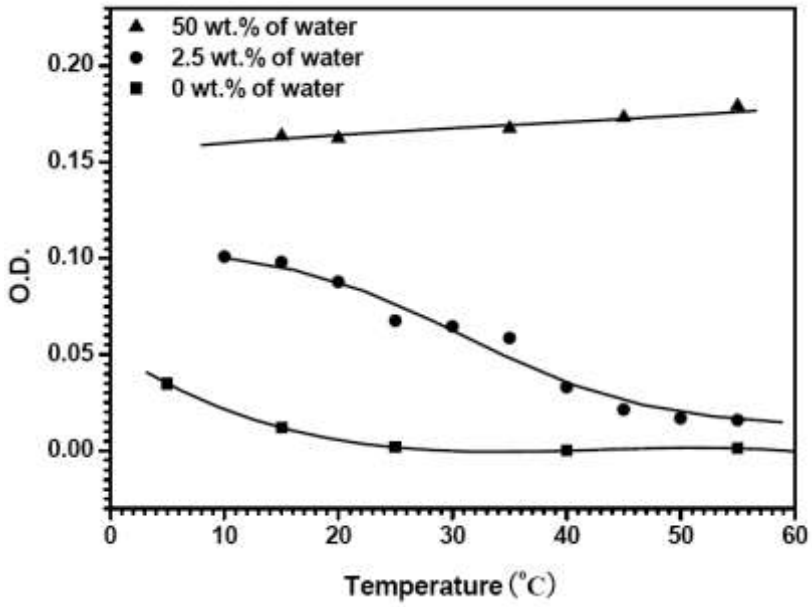



Fig. SI-3 Turbidity value as a function of temperature for $PEG_{114}$-b-$PAChol_{60}$ micellar dispersions at given concentrations of water prepared initially at 25°C by nano-precipitation.

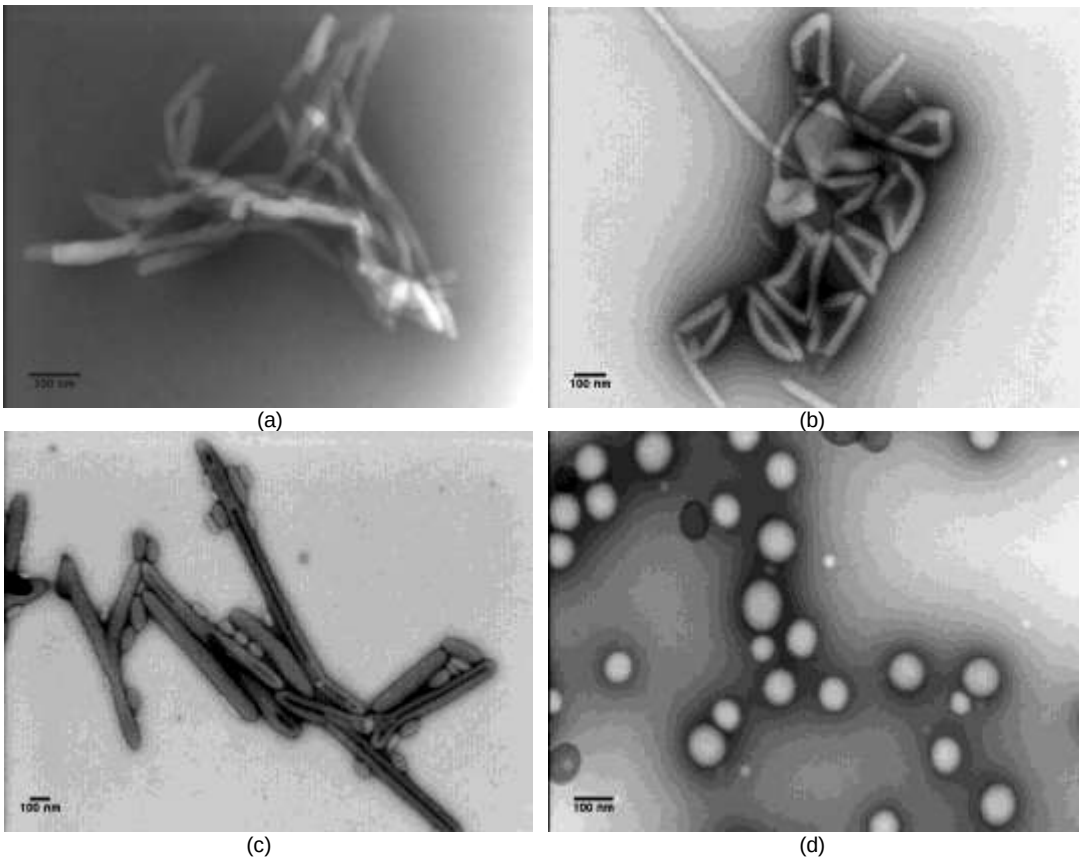



Fig. SI-4 TEM images of $PEG_{114}$-b-$PAChol_{60}$ self-assemblies obtained in water at different temperatures after keeping for 2 years. (a) 5°C; (b) 25°C; (c) 40°C; (d) 55°C. Scale bar = 100 nm.

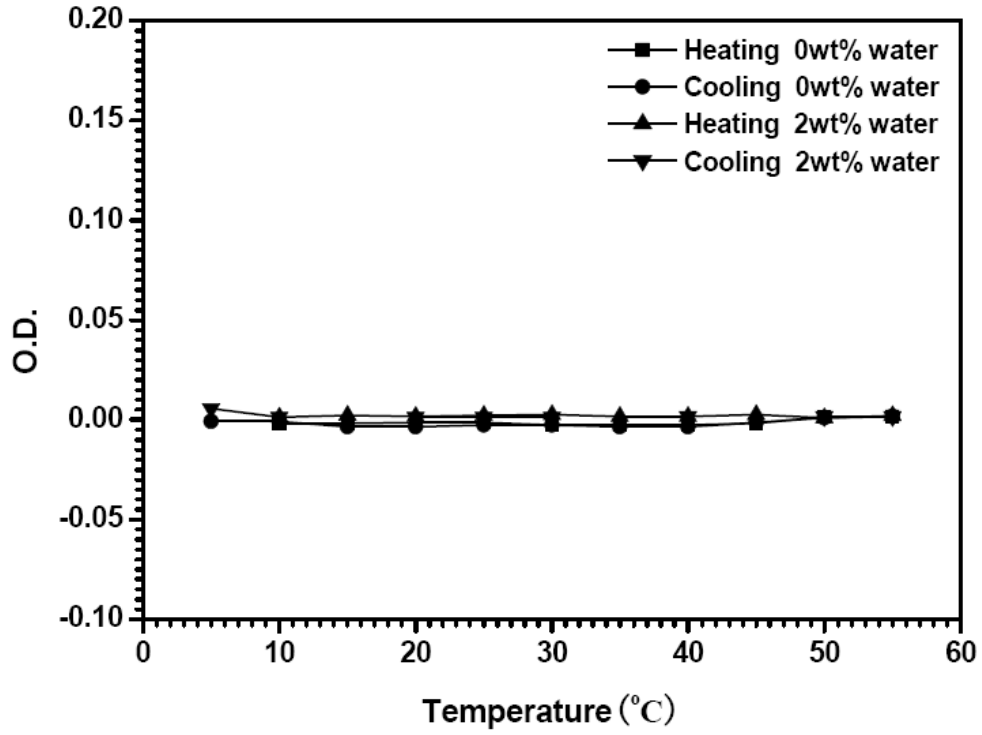



Fig. SI-5 Turbidity diagrams of PEG5000 with initial polymer concentration c = 0.1wt% in dioxane at different temperatures and with given concentration of water.