## Assembly and Evolution of Gemini-Type Peptide Amphiphile with a Di-Lysine Spacer

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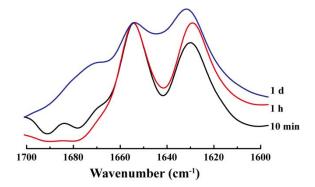


Figure S1. Time-dependent IR spectra of the dried 12-(Lys)<sub>2</sub>-12 samples. Three curves are normalized at 1655 cm<sup>-1</sup>.

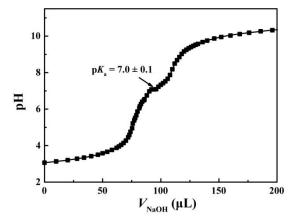
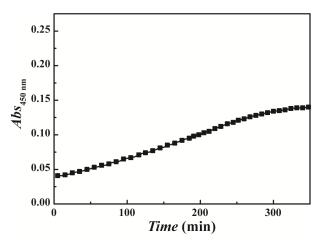


Figure S2. pH titration curve of 0.70 mM 12-(Lys)<sub>2</sub>-12 solution at 25.0 °C.



**Figure S3.** UV absorbance change with time of 0.70 mM 12-(Lys)<sub>2</sub>-12 solution at pH 7.4 and 25.0 °C.

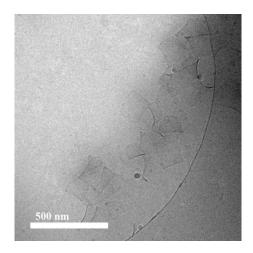


Figure S4. Cryo-TEM image of 0.70 mM 12-(Lys)<sub>2</sub>-12 solution at pH 7.4 and 25.0 °C.

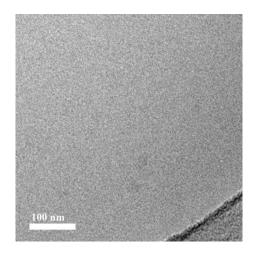


Figure S5. Cryo-TEM image of 0.70 mM 12-(Lys)<sub>2</sub>-12 solution at pH 3.0 and 50.0 °C.

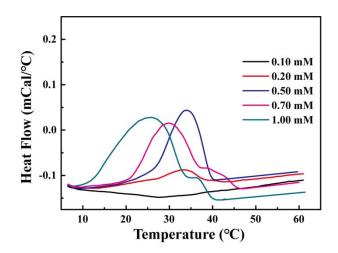
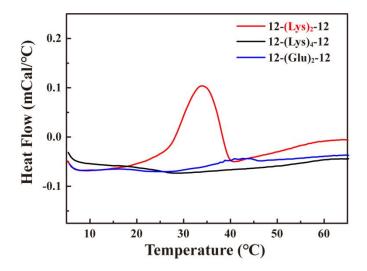


Figure S6. DSC thermograms of different concentrations of 12-(Lys)<sub>2</sub>-12 solutions at pH 3.0.



**Figure S7.** DSC thermograms of 12-(Lys)<sub>2</sub>-12 at pH 3.0 (red line), 12-(Lys)<sub>4</sub>-12 at pH 3.0 (black line) and 12-(Glu)<sub>2</sub>-12 at pH 11.0 (blue line). The concentrations of these PAs used are 0.70 mM.