Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Support information for:

Design of the nanocarrier having the regulated drug release ability utilizing a reversible conformational transition of peptide responded to slight pH changes

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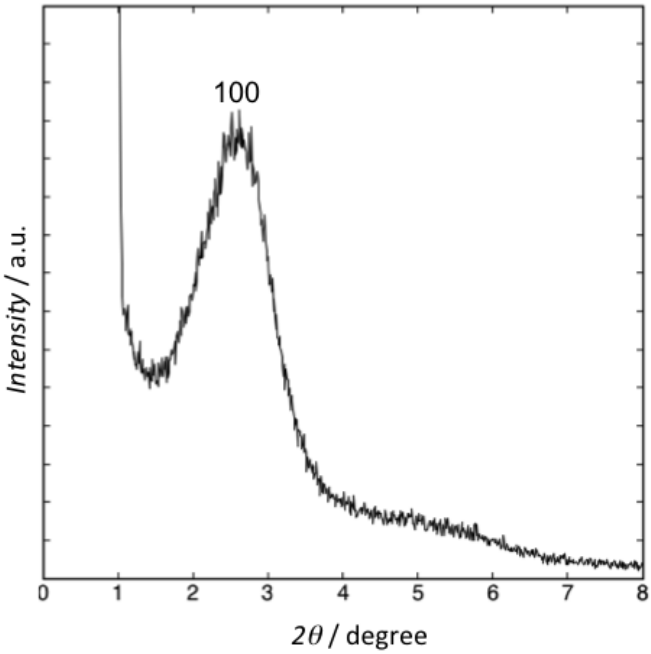
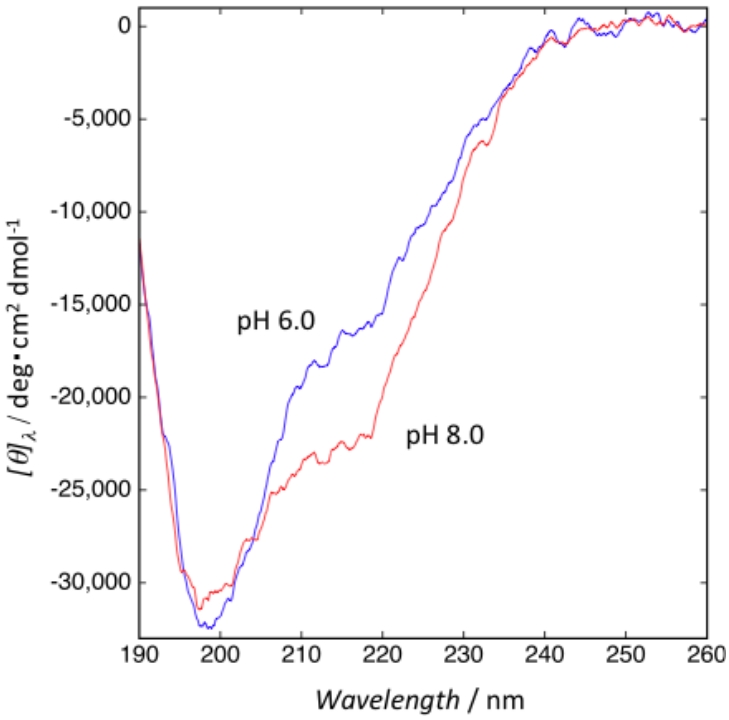
S1. Small angle X-ray diffraction pattern of the MSN



The pore structure was evaluated by small-angle X-ray diffraction (RINT-TTR, Rigaku, with CuKα, 50 kV, 300 mA) spectrum.

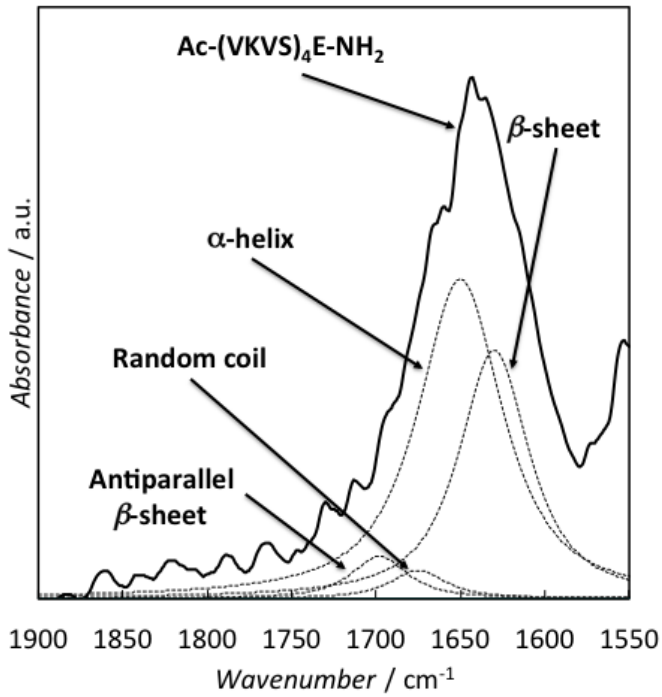
S2. CD spectra of pristine peptide on acidic: 6.0 and basic pH: 8.0



pH condition	Conformation / %		
	α-helix	β-sheet	Random coil
6.0	4.7	39.2	56.1
8.0	0.8	53.4	45.8

The pH-induced secondary structural changes of the pristine peptides in the aqueous solution were measured by the circular dichroism spectroscopy (J-820, JASCO). The concentrations of the pristine Ac-$(VKVS)_4$E-NH_2 peptide was fixed at 1.0×10^{-5} M. The pH of the peptide solutions was adjusted with 0.01 M HCl and 0.01 M NaOH.

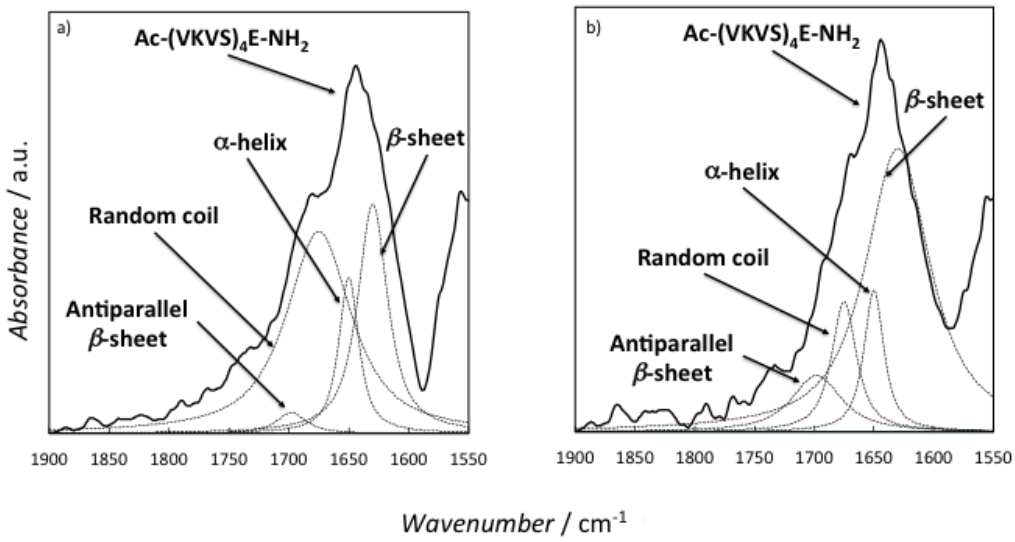
S3. Secondary structure of Ac-(VKVS)$_4$E-NH$_2$ on MSN in the dichloromethane solution



Solvent	Conformation / %		
	α-helix	β-sheet	Random coil
DCM	58.6	37.9	3.5

The sample was prepared as follows; the Pep-MSN was dispersed in the dichloromethane solution. The suspension was dried to obtain measurement sample. The sample pellet was prepared by the mixing of the Pep-MSN and KBr. The weight fraction of the Pep-MSN was fixed at 1 wt%. The TM-FTIR spectrum was measured over the range of 1900-1550 cm^{-1}. Dotted lines show the peak deconvolution of the amide I band to β-sheet, antiparallel β-sheet, α-helix and random coil conformations.

S4. TM-FTIR spectra of Pep-MSN-PtOEP on acidic and basic conditions



pH condition	Conformation / %		
	α-helix	β-sheet	Random coil
6.0	13	30	57
8.0	12	75	13

TM-FTIR spectra of Ac-$(VKVS)_4$E-NH_2 peptide on the PtOEP loaded MSN: a) under the weakly acidic condition (pH 6.0) and b) under the basic condition (pH 8.0)