

# Supporting Information

## Light-controlled switching of the self-assembly of ill-defined amphiphilic SP-PAMAM

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## 1.0 Synthesis of 3.0G-PAMAM.

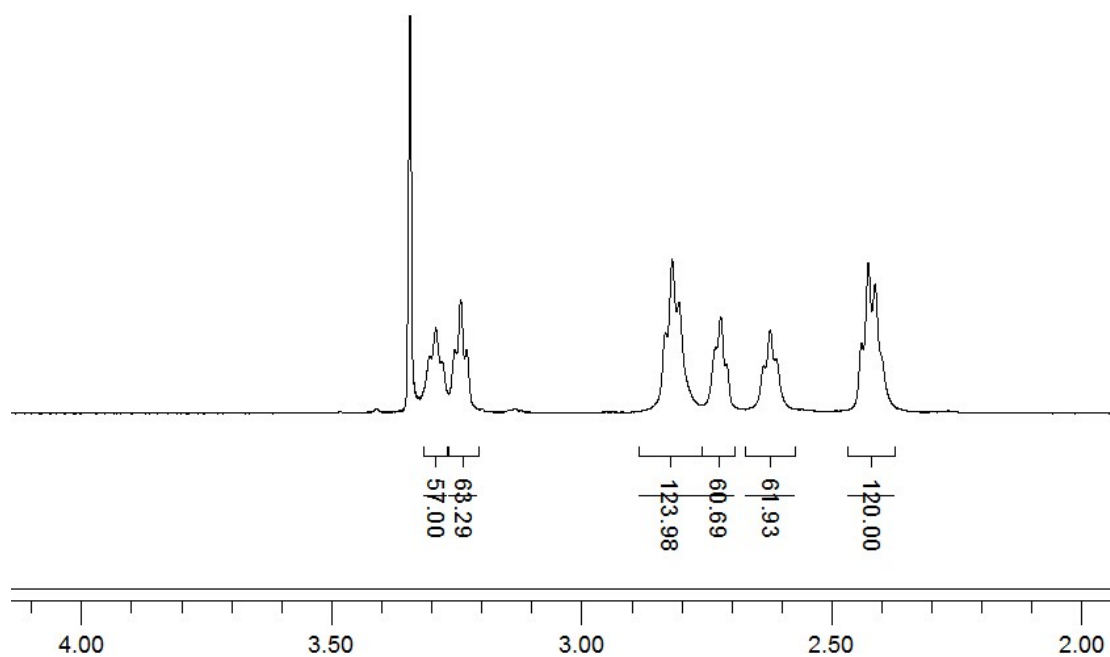
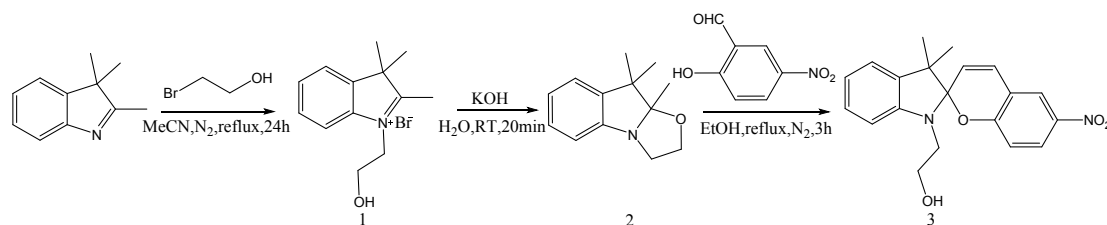


Figure S1. <sup>1</sup>H-NMR (500MHz, D<sub>2</sub>O, 25°C, TMS) spectrum of the synthesized PAMAM.

## 2.0 Synthesis of spiropyran (SP)



Scheme S1. Synthesis of the Spiropyran.

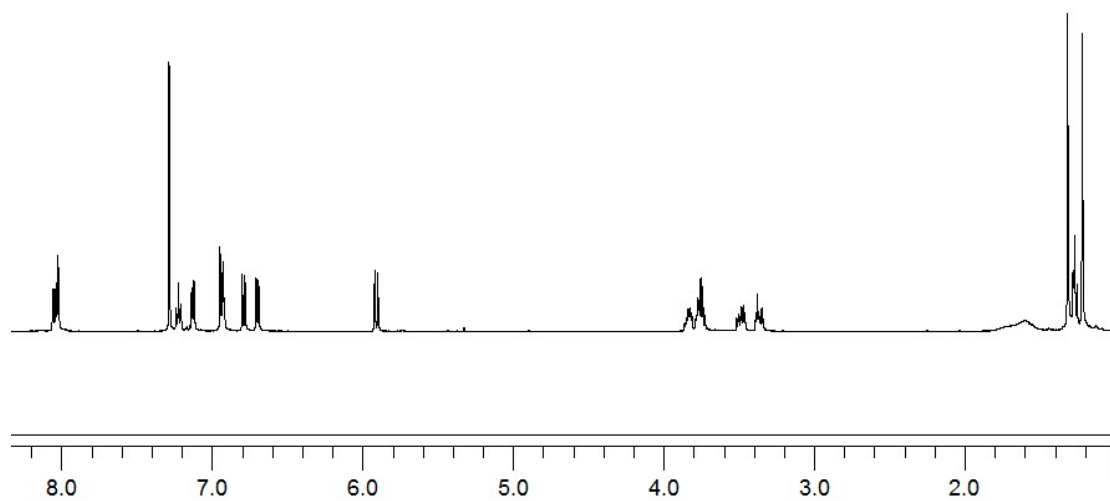
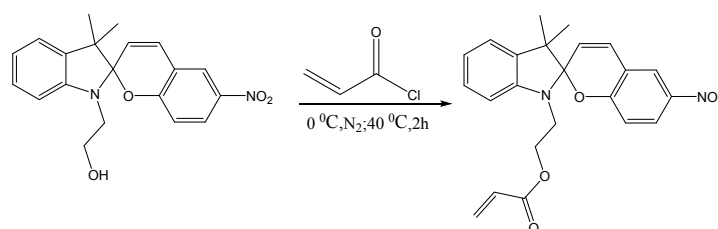


Figure S2.  $^1\text{H-NMR}$  (500MHz, DMSO, 25°C, TMS) spectrum of the synthesized Spiropyran.

### 3.0 Synthesis of acryl-modified SP derivative (SPA)



Scheme S2. Synthesis of acryl-modified SP derivative (SPA).

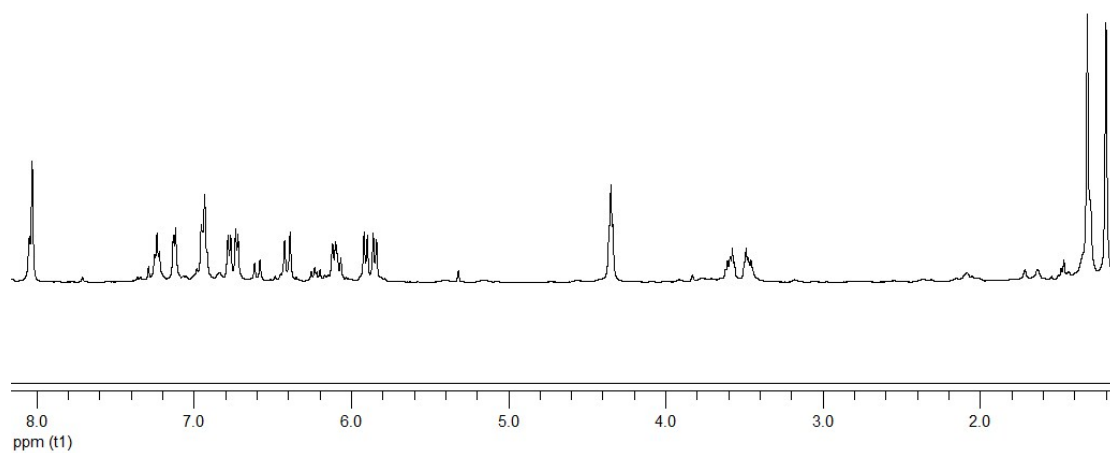


Figure S3.  $^1\text{H-NMR}$  (500MHz,  $\text{CDCl}_3$ ,  $25^\circ\text{C}$ , TMS) spectrum of the synthesized acryl-modified SP derivative (SPA).

#### 4.0 Synthesis of spiropyran conjugated 3.0G-PAMAM (SP-P3)

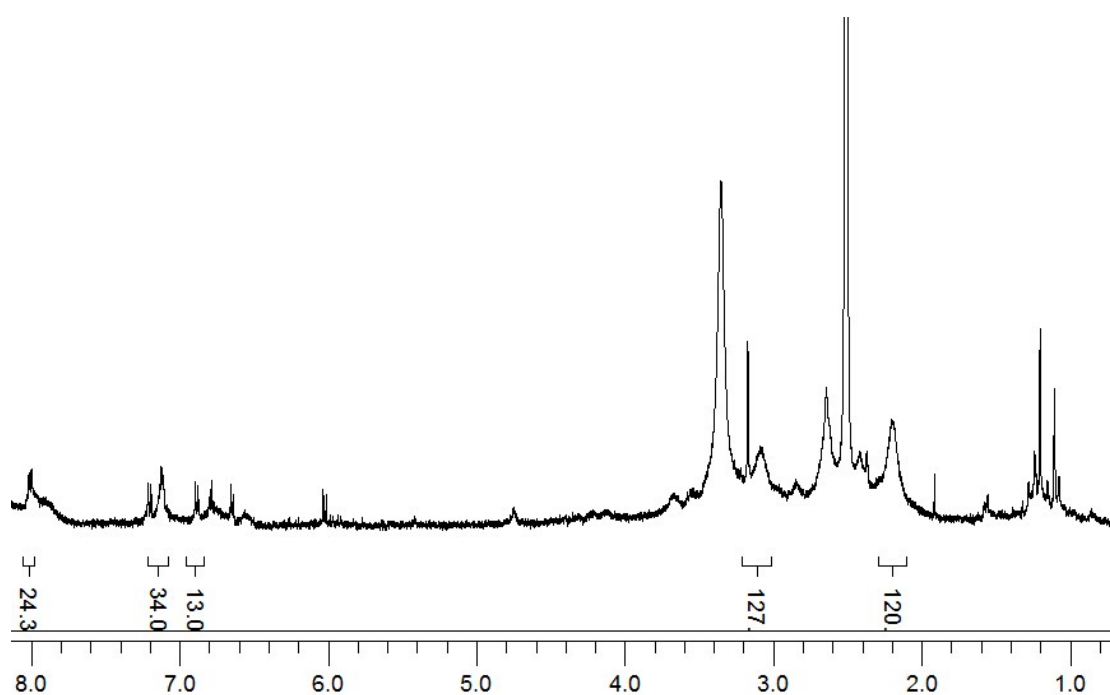


Figure S4-1.  $^1\text{H-NMR}$  (500MHz, DMSO,  $25^\circ\text{C}$ , TMS) spectrum of the synthesized spiropyran conjugated 3.0G-PAMAM (SP-P3) with 38%SP.

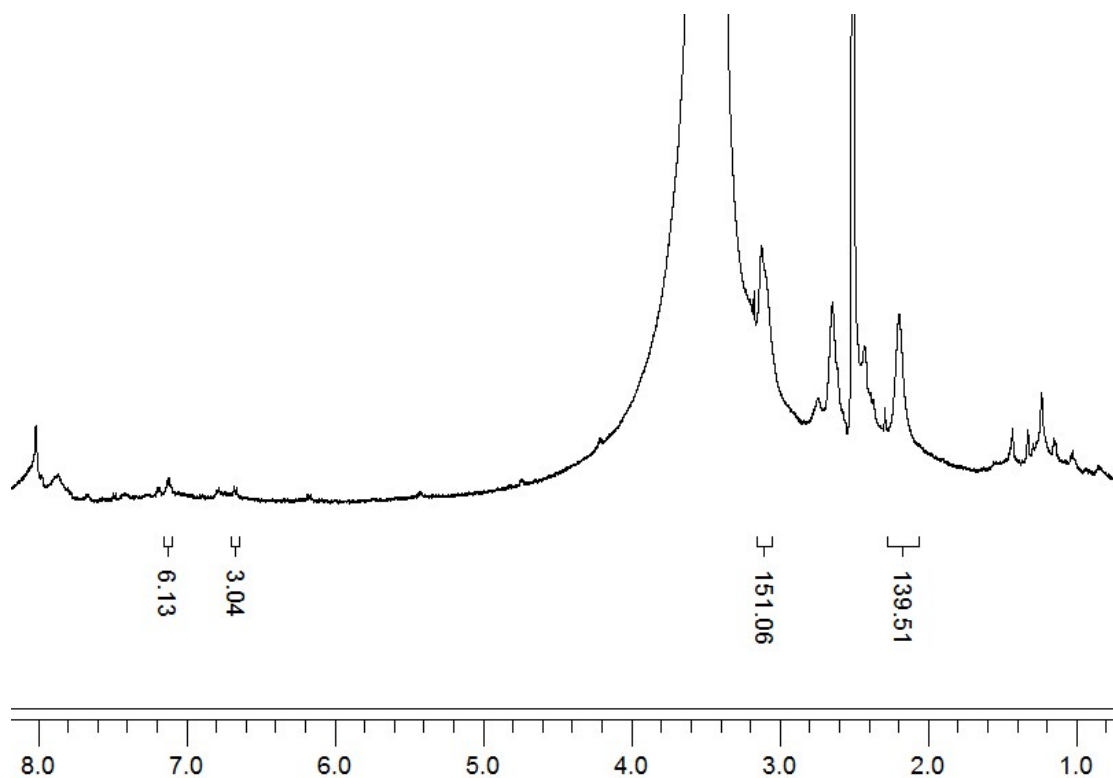


Figure S4-2.  $^1\text{H-NMR}$  (500MHz, DMSO, 25°C, TMS) spectrum of the synthesized spiropyran conjugated 3.0G-PAMAM with 9% SP.

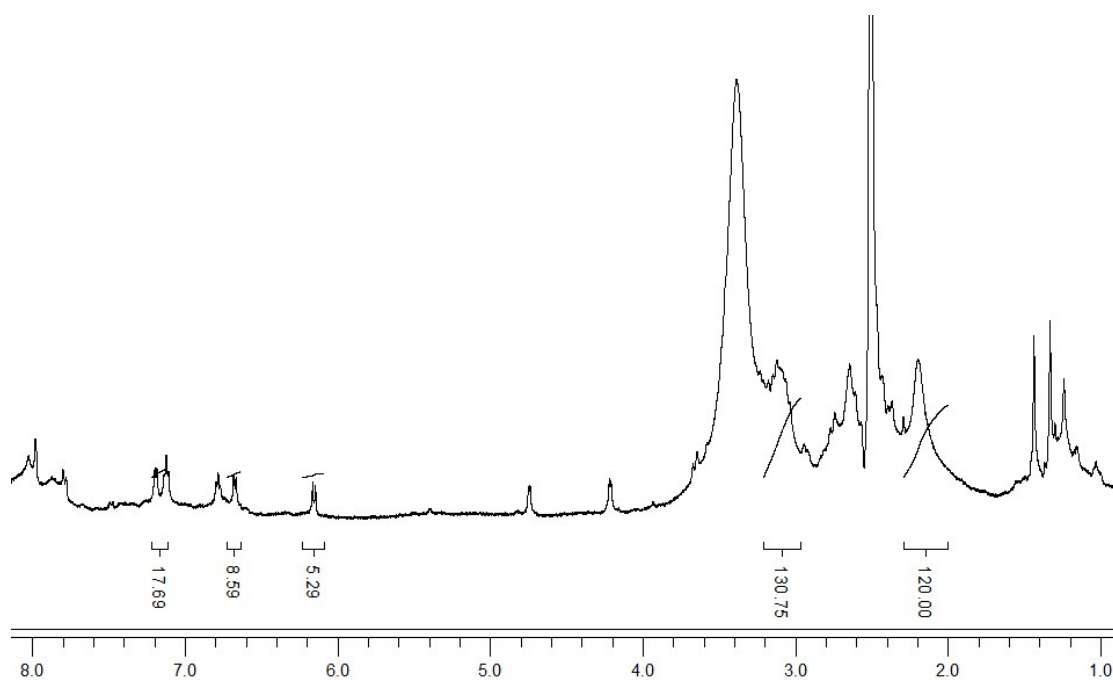


Figure S4-3.  $^1\text{H-NMR}$  (500MHz, DMSO, 25°C, TMS) spectrum of the synthesized

spiropyran conjugated 3.0G-PAMAM with 18% SP.

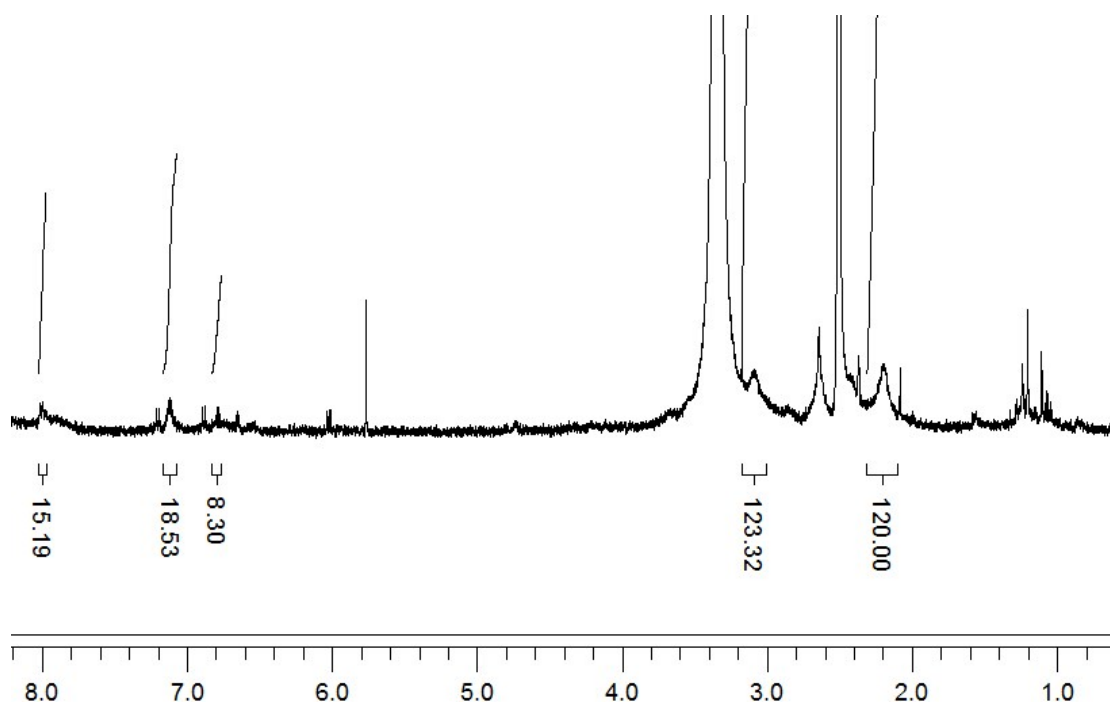


Figure S4-4.  $^1\text{H}$ -NMR (500MHz, DMSO, 25°C, TMS) spectrum of the synthesized spiropyran conjugated 3.0G-PAMAM with 25% SP.

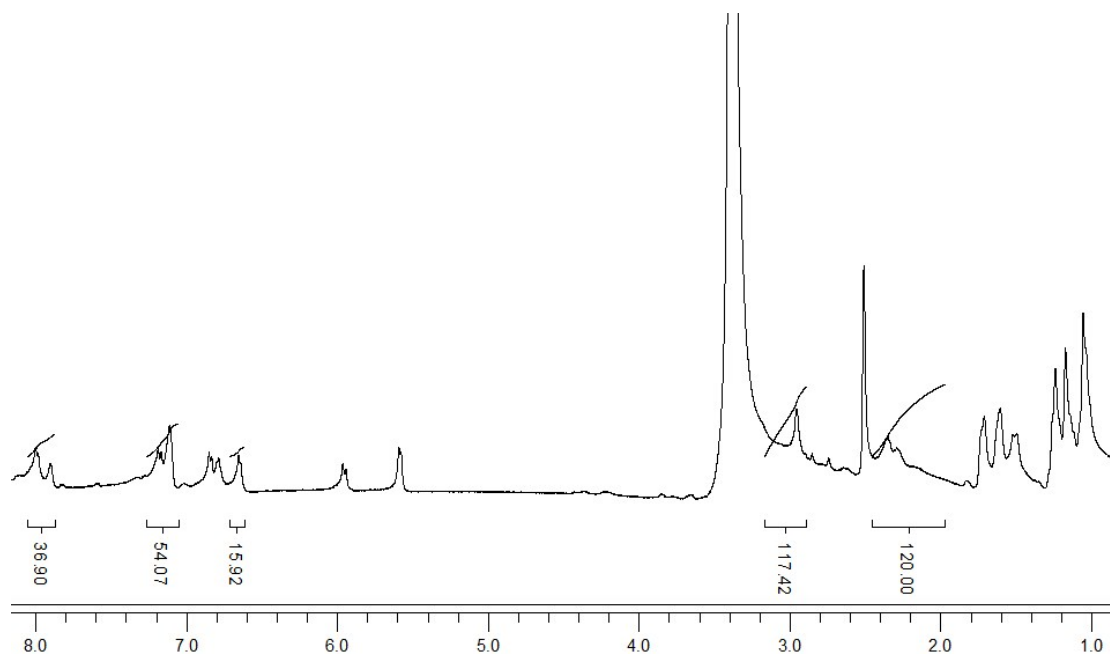


Figure S4-5.  $^1\text{H}$ -NMR (500MHz, DMSO, 25°C, TMS) spectrum of the synthesized spiropyran conjugated 3.0G-PAMAM with 50% SP.

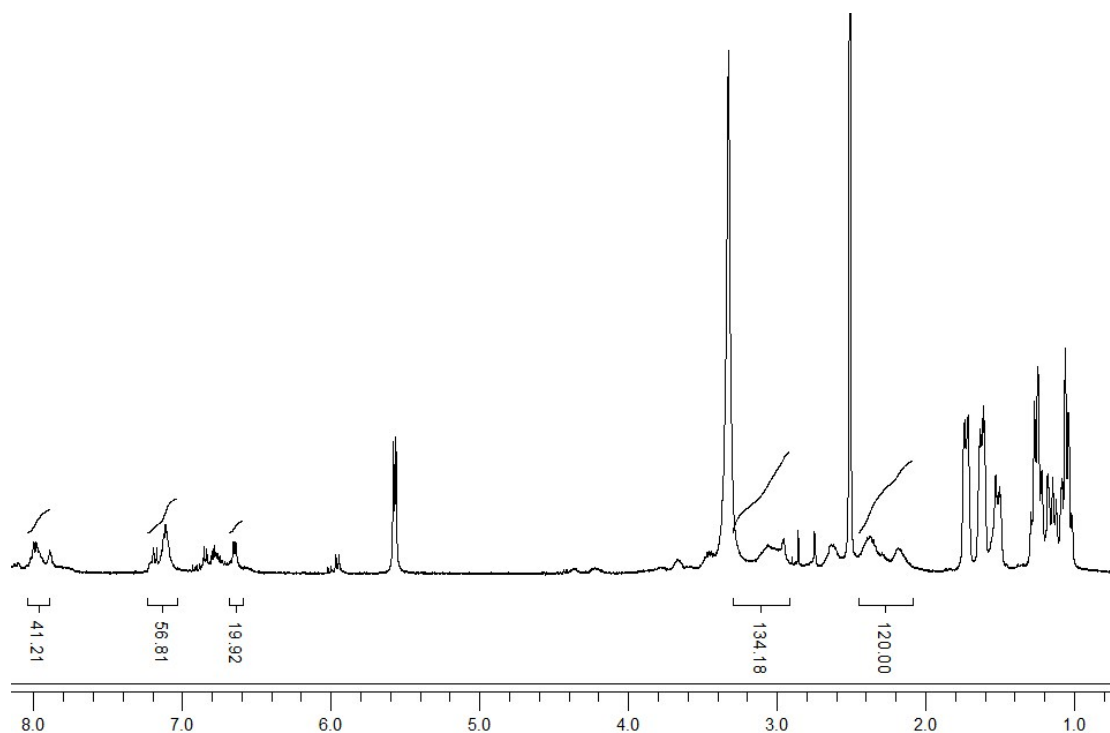


Figure S4-6.  $^1\text{H-NMR}$  (500MHz, DMSO, 25°C, TMS) spectrum of the synthesized spiropyran conjugated 3.0G-PAMAM with 63% SP.

## 5.0 UV/Vis spectra of SPA, MCA, SP-PAMAM, MC-PAMAM

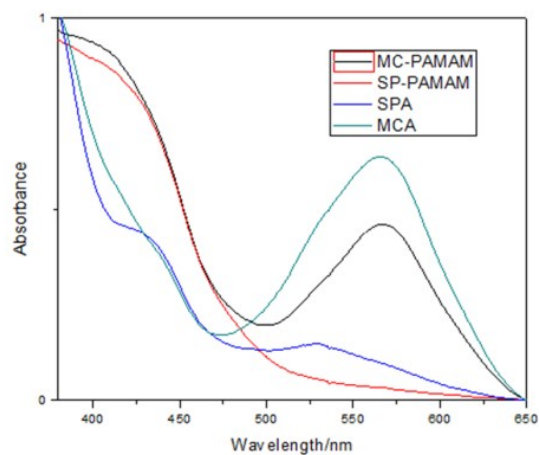


Figure S5. The UV/Vis spectrum. Red line represents MC-PAMAM. Red line represents SP-PAMAM. Blue line represents SPA. Green line represents MCA. The solvent is DMF.

## 6.0 SEM images of controls

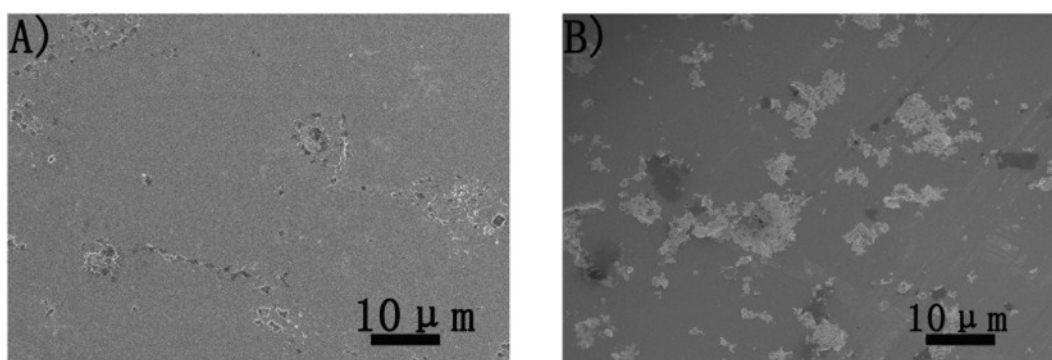


Figure S6. SEM images of controls. Picture A) 3.0G-PAMAM (0.3mg/mL). B) SP-P3 with 63% percentage of SP (0.3mg/mL).

## 7.0 TEM images of multi-micelles



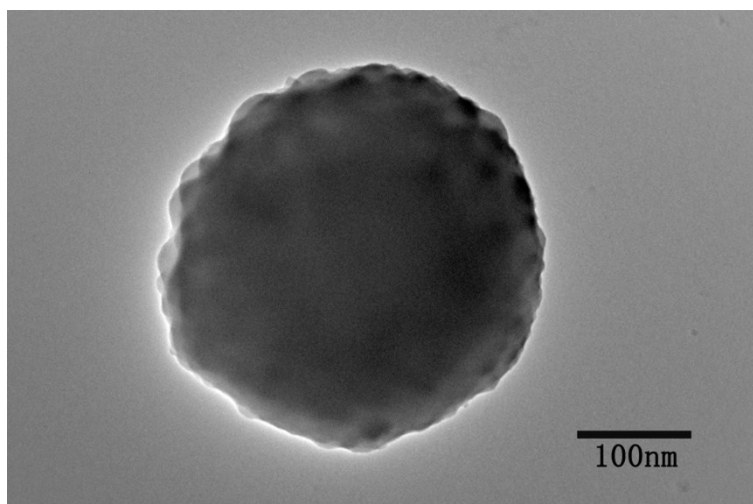


Figure S7. TEM images of multi-micelles. The size was about 300nm and from this picture we could clearly found that it was formed of lots of small particles.

## **8.0 SEM images of small particles which formed after UV light irradiation**

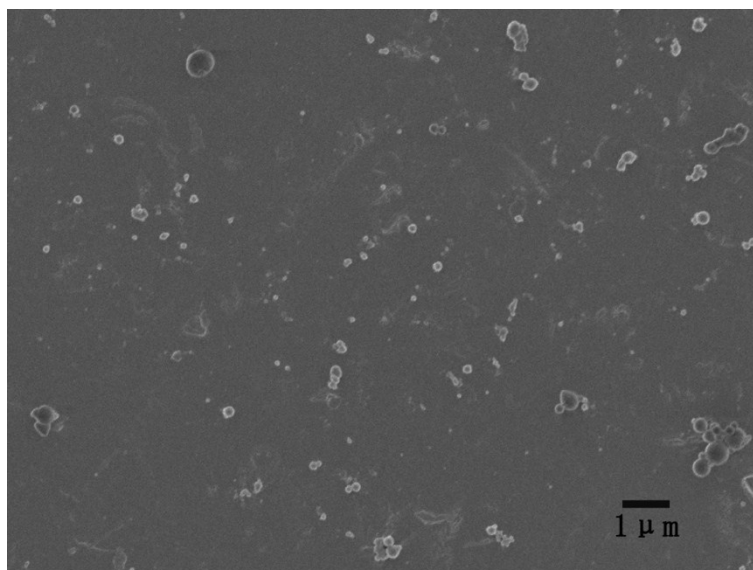


Figure S8. SEM images of small particles which formed after UV light irradiation. The size of them were about 200-700nm.

## 9.0 DLS data of the photoswitching of disruption and regeneration of the macrorods

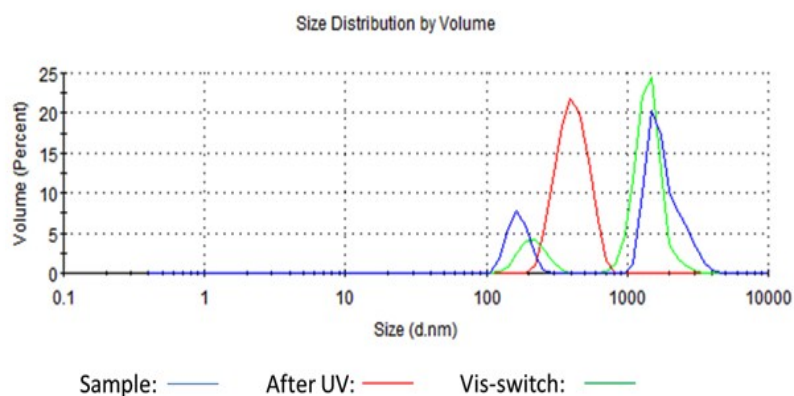


Figure S9. DLS data of the photoswitching of disruption and regeneration of the macrorods; Blue line: original condition. Red line: after UV light (365nm) irradiation for 10.0 min. green line: the regenerated condition.