## **Supporting Information**

## Photocleavable Coumarin Crosslinkers Based Polystyrene Microgels: Phototriggered Swelling and Release

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1. The high-resolution mass analysis for the photolysis products of CLA and CLB:





It suggested that only the 4-positioned hydroxylmethyl was cleaved by light in the presence of trace of water, which provided effective evidence for explaining the different swelling rate between **MGA** and **MGB**.

 The fluorescent spectra comparision among CLA monomer, pure MGA and MGA with NR loading.



The fluorescence of MGA was compared with CLA that contained theoratically equal molar coumarin. Upon the excitation of 380 nm, the fluorecent intensity of CLA and MGA was similar, which suggested that self-quenhing phenomenon of coumarin in the microgel was negligible and the low emission intensity of NR loaded MGA should mainly be resulted from the NRET from excitated coumarin to NR.

3. The comparison of NR absorption, emission spectra of **CLA** and excitation spectra of **MGA** with NR loading.



As shown in the above figure, the significant overlap between the emission spectra of **CLA** and the absorption spectra of NR suggested the possibility of the occurrence of NRET from the excitated coumarin to NR. Thus, once the distance between coumarin and NR chromopores is near enough, the NRET should be occurred effectively. Moreover, the excitation spectrum of NR loaded **MGA** was tested with the emission wavelength of 650 nm (NR emission). The appearance of the excitation peak of coumarin around 380 nm provided the direct evidence of NRET from the excitated coumarin to NR chromophore.

4. The emission spectra of the release NR in water solution by dialysis before and



after light irradiation.

Moreover, photoinduced release of NR was further processed by detecting the dispersed NR in the water by dialysis. Both non-irradiated and irradiated MGA aqueous solutions were poured into the dialysis cap, then the solution outside the dialysis cap was taken for fluorescent test. Before the test, 30% DMSO was added since NR was insoluble in water and the fluorescence in water was negligible. As shown in the following figure, the appearance of NR fluorescence upon irradiation further confirmed the release of NR into the aqueous solution. This section was not shown in the main text and presented here as supporting information for providing more evidence for the NR release into aqueous phase.