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Fig. S1 (a) MALDI-TOF mass spectrum of Y³⁺-PyrHA in methanol and (b) the composition of proposed fragments



Fig. **S2** Fluorescence spectra of (a) Y^{3+} -PyrHA, (b) MMC₆₀ and (c) Y^{3+} -PyrHA/MMC₆₀ in DMSO-toluene (4/1, v/v) ($\lambda_{ex} = 320 \text{ nm}$). [Y^{3+} -PyrHA] = [MMC₆₀] = 10 μ M.



Fig. **S3** The hydrodynamic radius (Rh) and polydispersity index (PDI) for Y^{3+} -PyrHA/MMC₆₀ and Y^{3+} -PyrHA/MMC₇₀ in buffer solution (HEPES, 10 mM, pH 7.4) containing 1% P123. [MMC₇₀] = [MMC₆₀] = [Y^{3+}-PyrHA] = 20 \,\muM.



Fig. S4 (a) Transient absorption spectra of MMC_{60} (20 μ M) observed by 355 nm laser irradiation in Ar-saturated 1% P123 buffer solution (HEPES, 10 mM, pH 7.4). (b) Time profiles of MMC_{60} at 720 nm in the absence and presence of Y^{3+} -PyrHA in 1% P123 buffer solution (HEPES, 10 mM, pH 7.4). [Y^{3+} -PyrHA] = [MMC_{60}] = 40 μ M.



Fig. S5 Transient absorption spectra of MMC_{60} (40 μ M) observed by 355 nm laser irradiation in air-saturated DMSO-toluene (4/1, v/v) and 1% P123 buffer solution (HEPES, 10 mM, pH 7.4).