Supporting Information

Size and surface controllable metal-organic frameworks (MOFs) for fluorescence imaging and cancer therapy

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Supplementary Information:

Experimental Section

Preparation of UIO-66-NH_2-FA-5-FAM

Typically, 0.1g UIO-66-NH_2, 0.2 g FA and 0.2g 5-FAM were added to aqueous solution. Afterwards, 0.1 g N-(3-dimethylaminopropyl)-N-ethylcarbodiimide hydrochloride (EDC) was added to the above solution, which was subsequently stirred in the dark at room temperature for 16 h to allow the FA and 5-FAM to conjugate onto the UIO-66-NH_2. The obtained UIO-66-NH_2-FA-5-FAM nanocomposite was isolated from solution through centrifugation, followed by washing with water and then kept in water for drug release study and then dried under vacuum at 25 °C.

Preparation of UIO-66-NH_2-5-FAM/5-FU

Typically, 0.1 g 5-FU loaded UIO-66-NH_2, 0.2g 5-FAM were added to saturated aqueous solution of 5-FU. Afterwards, 0.1 g N-(3-dimethylaminopropyl)-N -ethylcarbodiimide hydrochloride (EDC) was added to the above solution, which was subsequently stirred in the dark at room temperature for 16 h to allow the 5-FAM to conjugate onto the UIO-66-NH_2. The obtained UIO-66-NH_2-5-FAM/5-FU nanocomposite was isolated from solution through centrifugation, followed by washing with water and then dried under vacuum at 25 °C.

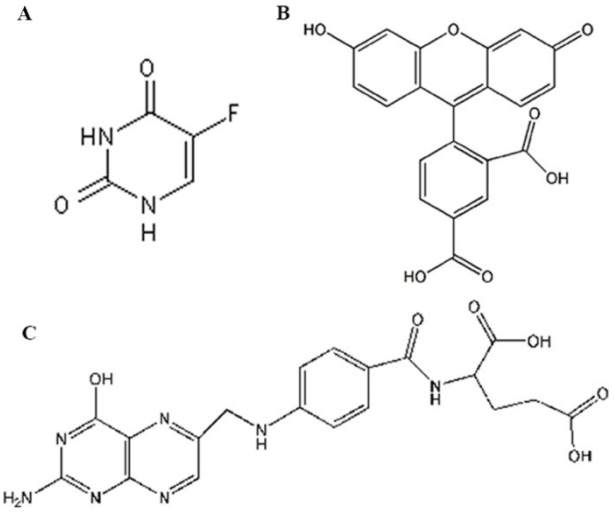

Figure S1. Chemical structures of 5-FU (A), 5-FAM (B) and FA (C)

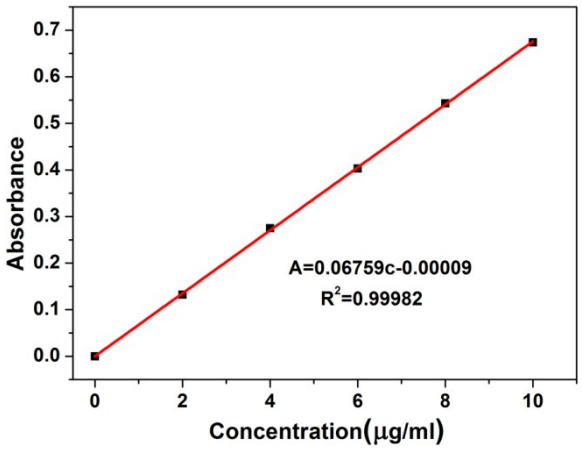

Figure S2. The calibration curve of 5-FU

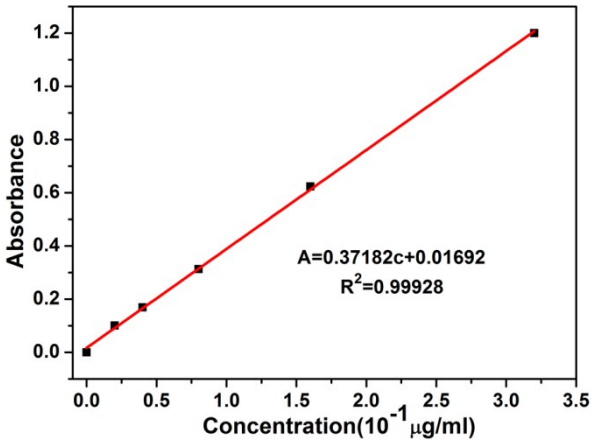

Figure S3. The calibration curve of FA

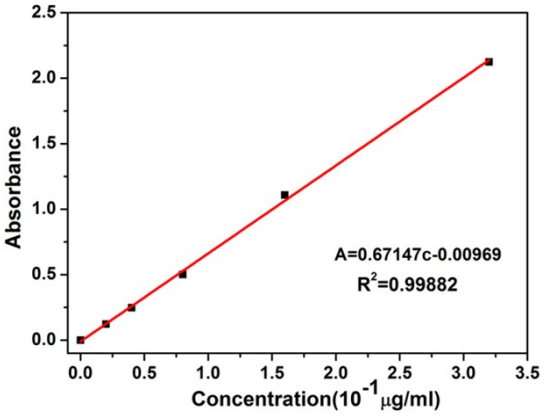

Figure S4. The calibration curve of 5-FAM

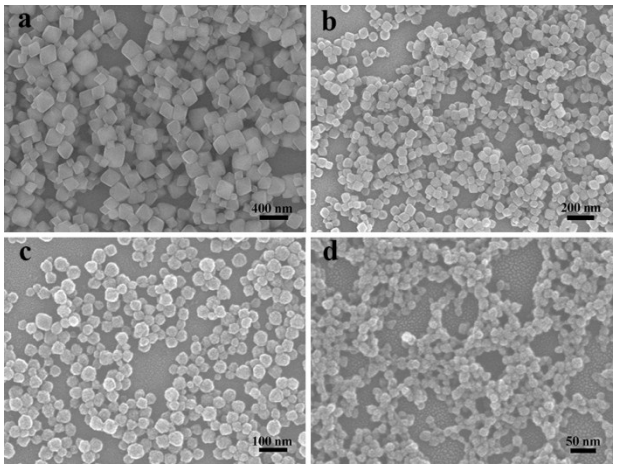

Figure S5. SEM images of UIO-66-NH_2 with different sizes (a-d)

Table S1. BET surface area comparison between reported UIO-66-NH_2 and the synthesized UIO-66-NH_2 (50 nm) in this paper.

BET surface area of UIO-66-NH_2	Reference
826 m^2/g	This work
816 m^2/g	[1]
931 m^2/g	[2]
1075 m^2/g	[3]
1258 m^2/g	[4]
1181 m^2/g	[5]

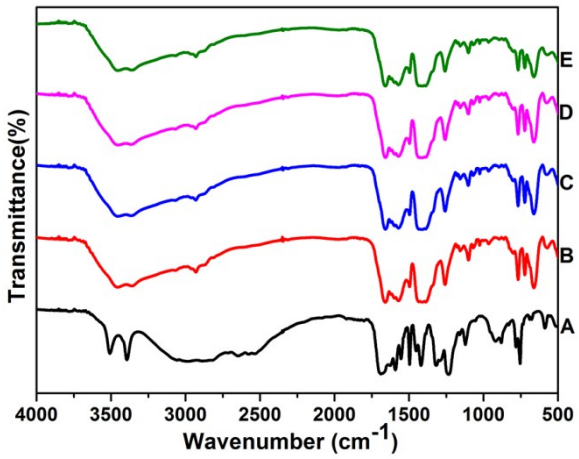

Figure S6. FTIR spectra of H_2BDC (A), UIO-66-NH_2 with different sizes (B-D)

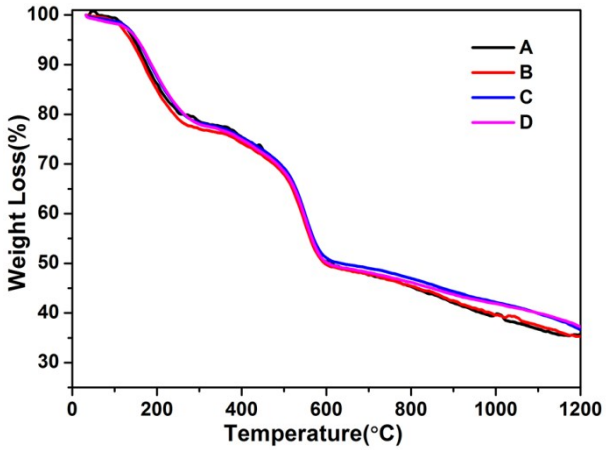

Figure S7. TGA curves of UIO-66-NH_2 with different sizes (A-D)

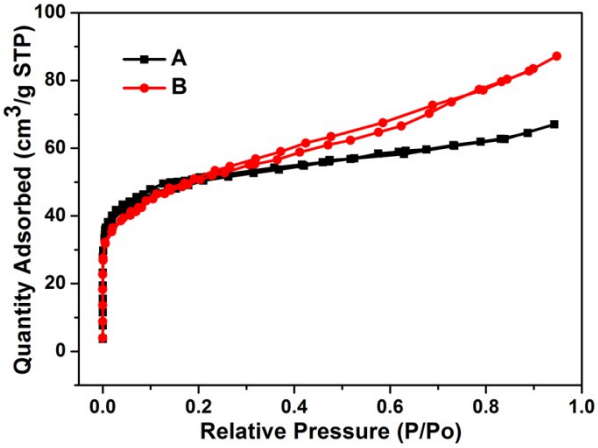

Figure S8. Nitrogen adsorption-desorption isotherms of UIO-66-NH_2/5-FU (A) and UIO-66-NH_2-FA-5-FAM/5-FU (B). The particle size of UIO-66-NH_2 used is 50 nm.

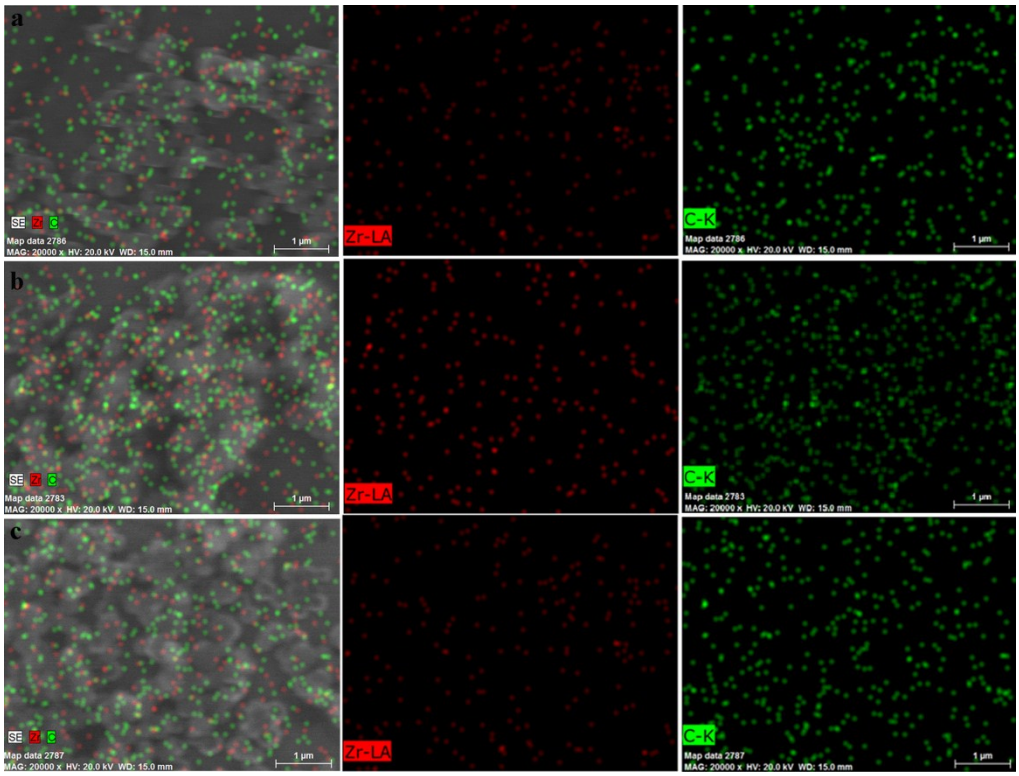

Figure S9. (a) SEM-EDX mapping of UIO-66-NH_2; (b) SEM-EDX mapping of UIO-66-NH_2-FA-5-FAM/5-FU; (c) SEM-EDX mapping of UIO-66-NH_2-FA-5-FAM/5-FU after drug release. The particle size of UIO-66-NH_2 used is 50 nm.

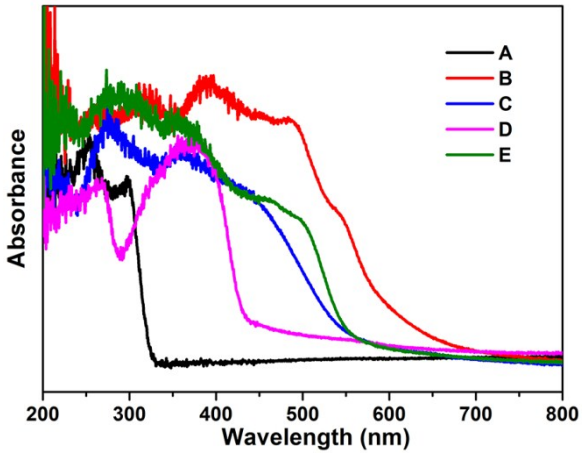

Figure S10. Solid UV-visible spectra of 5-FU (A), 5-FAM (B), FA (C), UIO-66-NH_2 (D) and UIO-66-NH_2-FA-5-FAM/5-FU (E). The particle size of UIO-66-NH_2 used is 50 nm.

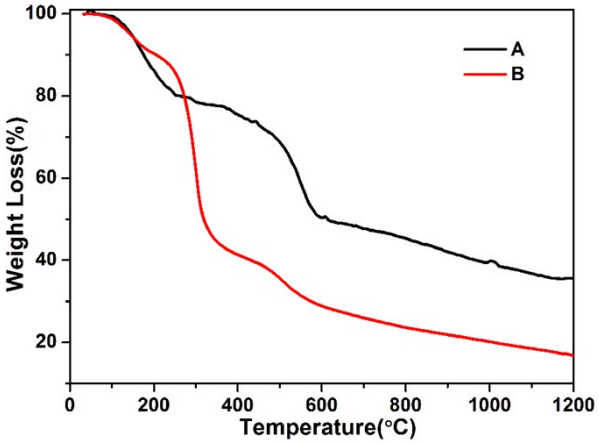

Figure S11. TGA curves of UIO-66-NH_2 (A) and UIO-66-NH_2-FA-5-FAM/5-FU (B). The particle size of UIO-66-NH_2 used is 50 nm.

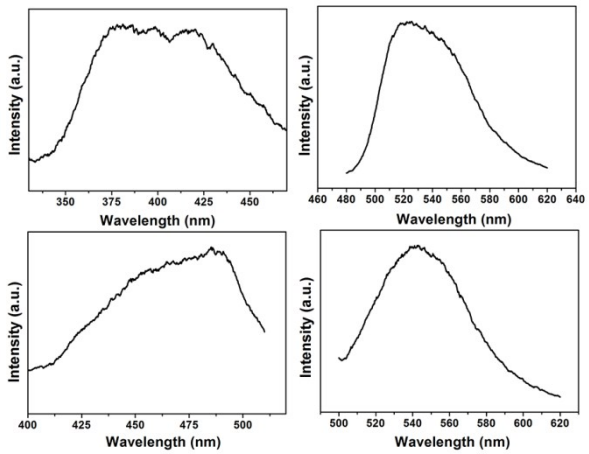

Figure S12. The excitation (A) and emission (B) spectra of 5-FAM and the excitation (C) and emission (D) spectra of UIO-66-NH_2-FA-5-FAM/5-FU. The particle size of UIO-66-NH_2 used is 50 nm.

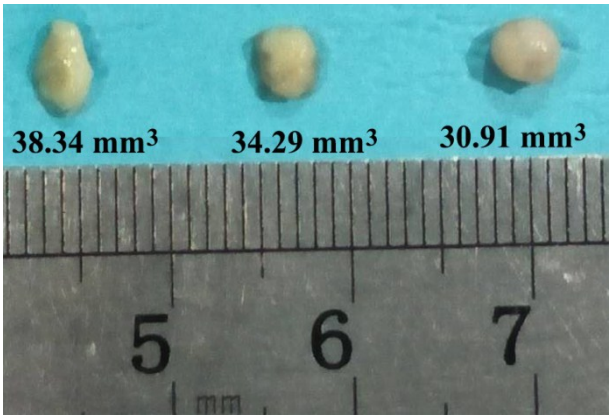

Figure S13. The excised tumors from mice groups treated with free 5-FU at 28nd day

Rererence

[1] M. Sarker, J. Y. Song and S. H. Jhung, *Chem. Eng. J.,* 2018, **331**, 124–131.

[2] X. L. Li, B. Y. Zhang, L. L. Tang, T. W. Goh, S. Y. Qi, A. Volkov, Y. C. Pei, Z. Y. Qi, C. K. Tsung, L. Stanley and W. Y. Huang, *Angew. Chem. Int. Ed.,* 2017, **56**, 16371–1637.

[3] T. He, X. B. Xu, B. Ni, H. Q. Wang, Y. Long, W. P. Hu and X. Wang, *Nanoscale,* 2017, **9**,19209–19215.

[4] H. Molavi, M. Zamani, M. Aghajanzadeh, H. K. Manjili, H. Danafar and A.Shojaei, *Appl. Organ. Ometal. Chem.,* 2018: e4221.

[5] A. Huang, L. L. Wan and J. Caro, *Mater. Res. Bull.,* 2018, **98**, 308-313.