**Supporting Information**

# Acetaldehyde-modified cystine modified Zr-MOFs for pH/GSH dual-responsive drug delivery and visualize GSH in living cells

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# Contents

## Chemicals and Reagents

Acetaldehyde, cystine, HCl (36.0-38.0%), 2-amino-terephthalic acid, N,N-dimethylformamide, Methotrexate (MTX), glutathione , N-hydroxysuccinimide, N-methylmaleimide, 1-ethyl-3-(3-dimethly-aminopropyl) carbodiimide were purchased from Aladdin Industrial Corporation. Zirconium chloride, 2-aminoterephthalic acid, acetic acid, sodium hydroxide were purchased from Sinopharm (Shanghai) Chemical Reagent Co., Ltd., China. All other chemicals used in this work were of analytical grade, obtained from commercial suppliers, and used without further purification unless otherwise noted. Fresh double-distilled water was used in all experiments.

## Characterization Methods

Powder X-ray diffractometry (XRD) patterns were obtained using a D8 Advance X-ray diffractometer (Bruker Company, Germany). Fourier Transform Infra-Red (FT-IR) spectra were obtained using a Spectrum One FT-IR spectrophotometer (Perkin-Elmer, USA) at room temperature. Transmission electron microscopy (TEM) images were obtained on a Tecnai G20 microscope (FEI, America). Morphologies of the samples were observed on a JSM6510LV scanning electron microscope (SEM, JEOL, Japan). The fluorescence measurements were recorded on LS55 fluorescence spectrometer (Perkin Elmer, America).

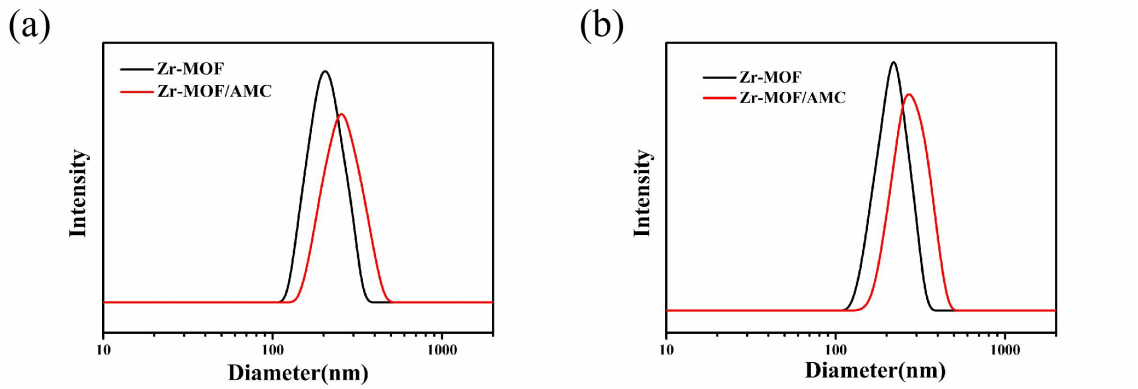


Fig.S1 Size distributions of Zr-MOF and Zr-MOF/AMC nanoparticles at pH=7.4 (a) and pH=5.8 (b) determined by DLS