Supporting Information

A new strategy for designing Zr-based metal organic frameworks to high efficient photocatalytic reduction of Cr(VI) under Visible light

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Synthesis of Zr-based MOFs with one hydroxyl group

Zr-based MOFs with one hydroxyl group was solvothermally prepared by a reaction of $ZrCl_4$ (0.125g) was dissolved in a mixed solvent of DMF/HCL (12mL, 10:2, v/v) and 2-Dihydroxyterephthalic acid (0.099g) was dissolved in 10 mL DMF. The two as-prepared solutions were mixed and stirred for 30 minutes. The mixture was carried out in an Teflon-lined stainless-steel autoclave sealed and heated to 80 ^{o}C for 12 hours. Yellow powders were obtained and washed with water and ethanol solvents several times. Finally, the as-synthesized sample was dried under oven at 60 ^{o}C for 12 hours for further use.

Figure 1S (a) XRD patterns of Uio-66-(OH). (b)SEM of image of Uio-66-(OH) with scale of 600nm. (c)SEM of image of Uio-66-(OH) with scale of 300nm. (d) FTIR spectra of Uio-66-(OH).

Figure 2S (a) Particle size distribution histogram of Uio-66-$(OH)_2$. (b) Particle size distribution histogram of Uio-66-(OH).

Figure 3S (a) Thermogravimetric (TG) of Uio-66-(OH) under N_2 atmosphere. (b)N_2 adsorption-desorption isotherms of Uio-66-(OH).

Figure 4S The photocatalytic reduction of Cr(VI) effect of pollutant concentration on reduction of Uio-66-(OH) by using UV-vis.

Figure 5S Zeta potential of Uio-66-$(OH)_2$ as a function of pH value.

Table S1 The parameters of the porous structure for different samples.

Table S2 Elements, weight and Atomic in Uio-66-$(OH)_2$ after Photocatalytic experiments.

Figure 1S

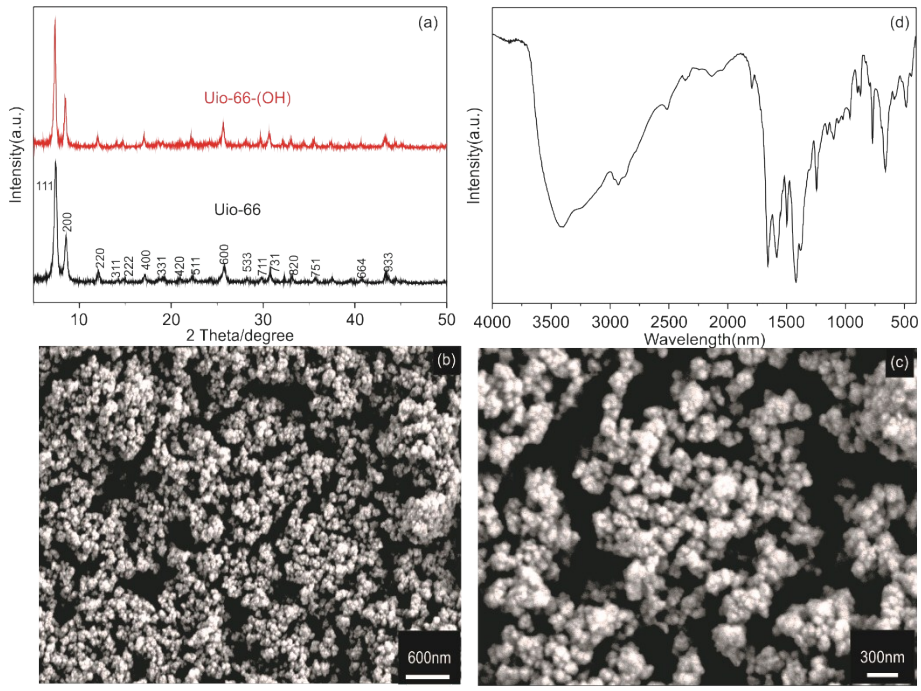

Figure 1S (a) XRD patterns of Uio-66-(OH). (b) SEM of image of Uio-66-(OH) with scale of 600nm.

(c)SEM of image of Uio-66-(OH) with size of 300nm. (d) FTIR spectra of Uio-66-(OH).

Figure 2S

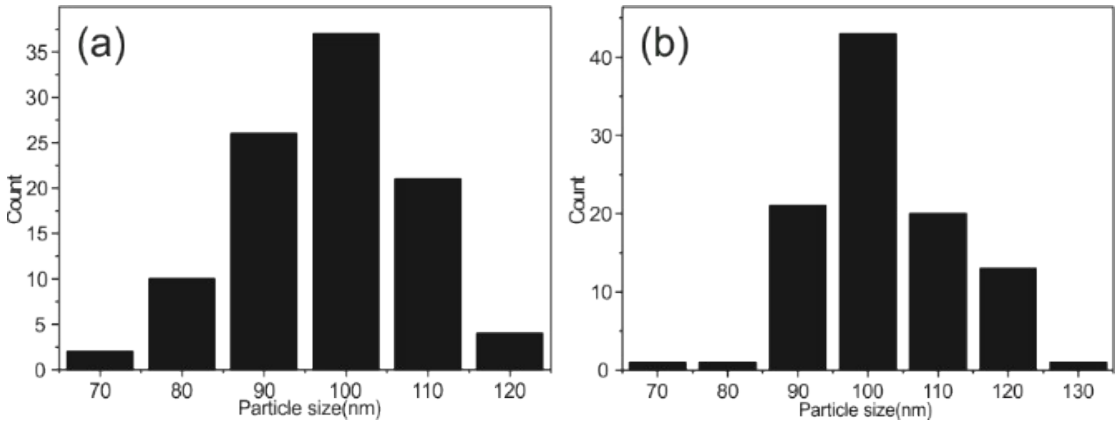

Figure 2S (a) Particle size distribution histogram of Uio-66-$(OH)_2$. (b) Particle size distribution histogram of Uio-66-(OH).

Figure 3S

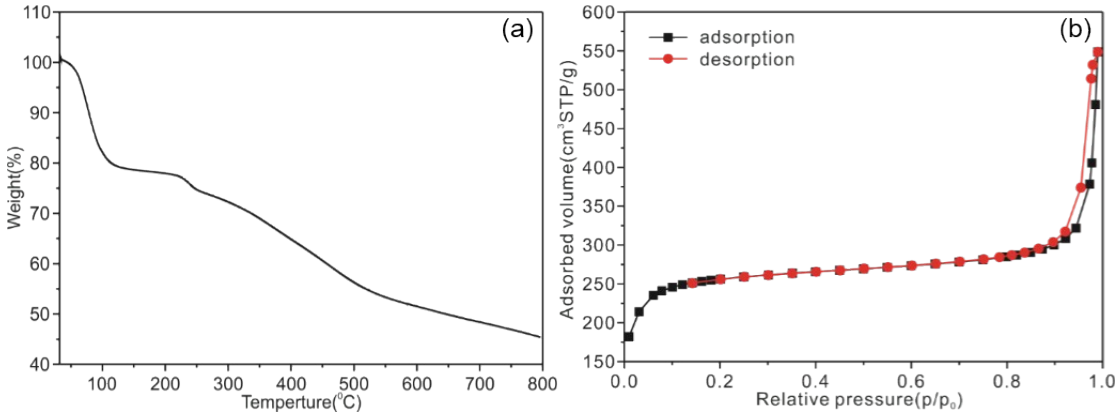

Figure 3S Thermogravimetric (TG) of Uio-66-(OH) under N_2 atmosphere and N_2 adsorption-desorption isotherms.

Figure 4S

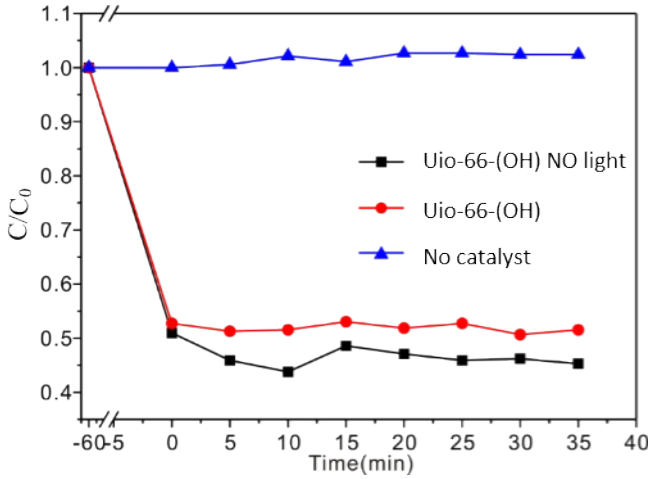

Figure 4S The photocatalytic reduction of Cr(VI) effect of pollutant concentration on reduction of materials by using UV-vis. (50 mg photocatalyst, 250 mL of 20ppm Cr(VI), reaction temperature is 25 °C, visible light, pH= 6.0)

Figure 5S

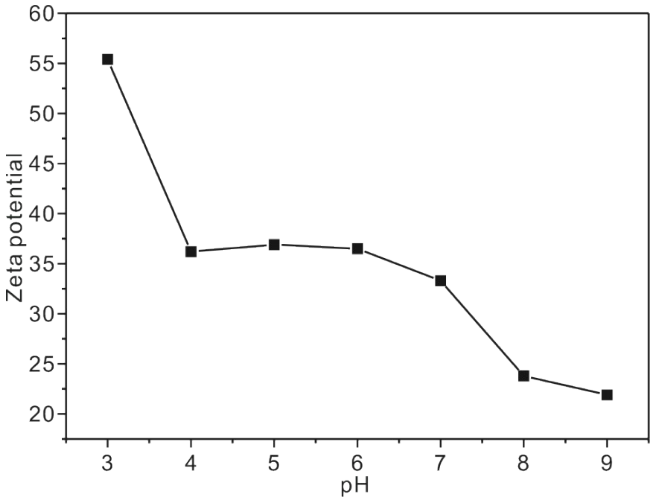

Figure 5S Zeta potential of Uio-66-$(OH)_2$ as a function of pH value.

Table S1 The parameters of the porous structure for different samples.

Material	BET surface area (m^2g^{-1})	Pore volume (cm^3g^{-1})
Uio-66-$(OH)_2$	561.51	0.54
Uio-66-(OH)	788.24	0.85
Uio-66-$(OH)_2$ after photocatalytic	292.01	0.58

Table S2 Elements, weight and Atomic in Uio-66-$(OH)_2$ after Photocatalytic experiments.

Element	Weight %	Atomic %
C K	34.18	51.23
O K	37.60	42.32
Zr K	22.31	4.40
Cr K	5.92	2.05