**Supporting Information for**

**Enhanced Adsorption of Cr(VI) on BiOBr under Alkaline Conditions: Interlayer Anion Exchange**

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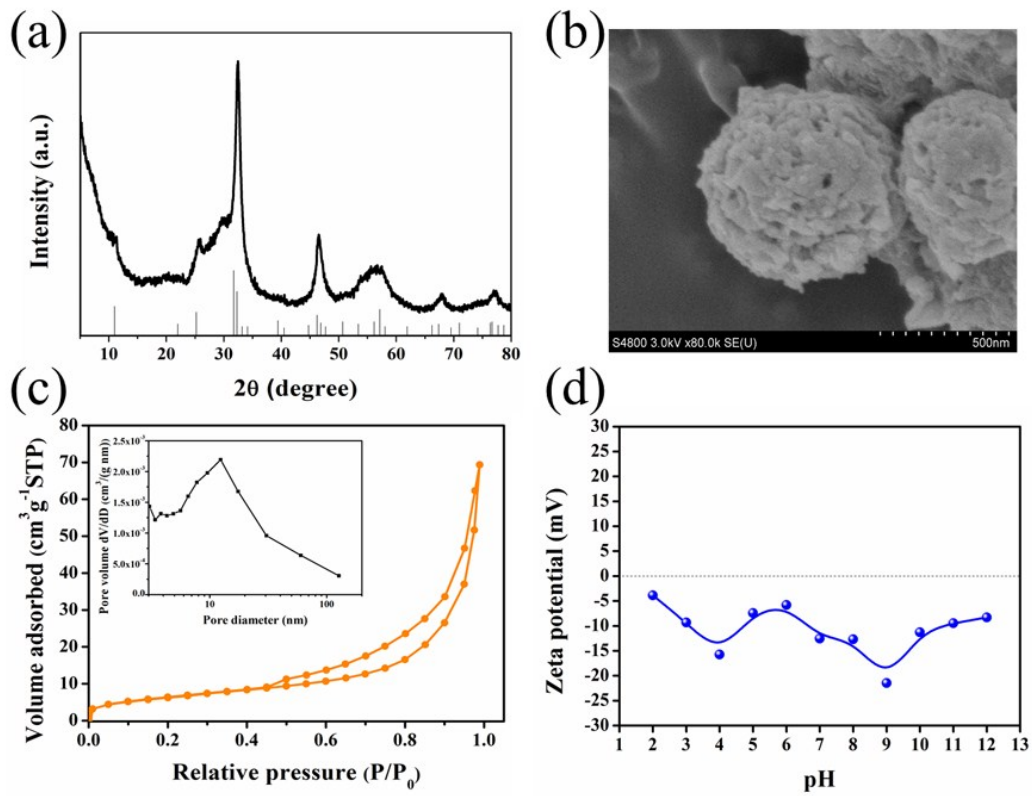
Email address: yutao@tju.edu.cn

**Figure S1.** (a) XRD pattern of BiOBr. (b) SEM images of BiOBr. (c) Nitrogen adsorption–desorption isotherm and the corresponding pore size distribution (inset) of BiOBr. (d) Zeta potential of BiOBr as a function of solution pH.
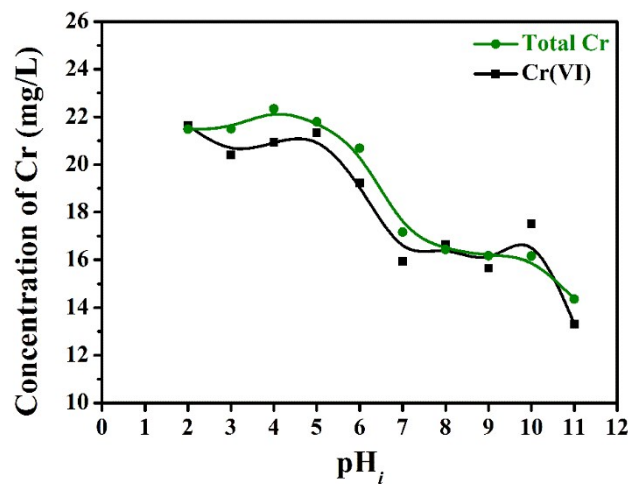


**Figure S2.** Effect of $pH_i$ on adsorption of Cr(VI) and total Cr by BiOBr.
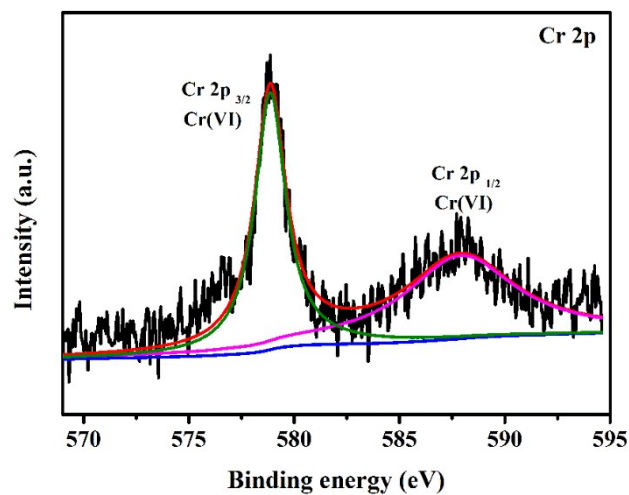
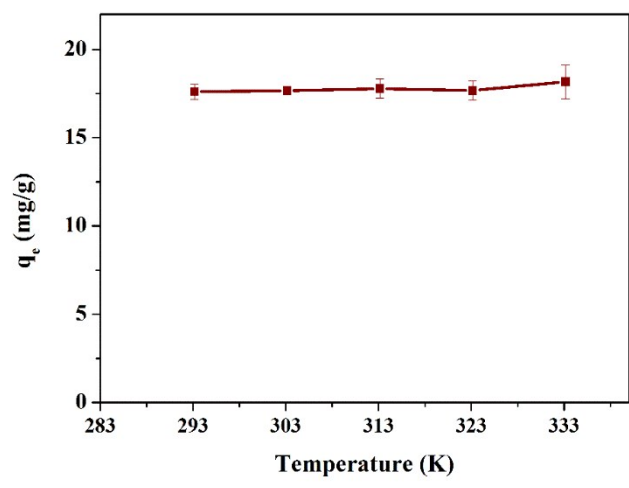**Figure S3.** High–resolution XPS spectra of Cr 2p of BiOBr–Cr.



**Figure S4**. The effect of temperature on the adsorption of Cr(VI) at 293.15 K, 303.15
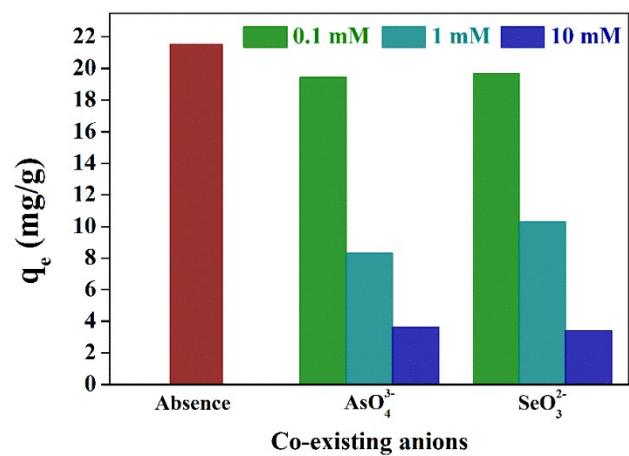
K, 313.15 K , 323.15 K and 333.15 K.



**Figure S5.** Effects of As(V) and Se(IV) on the adsorption of Cr(VI) on BiOBr.
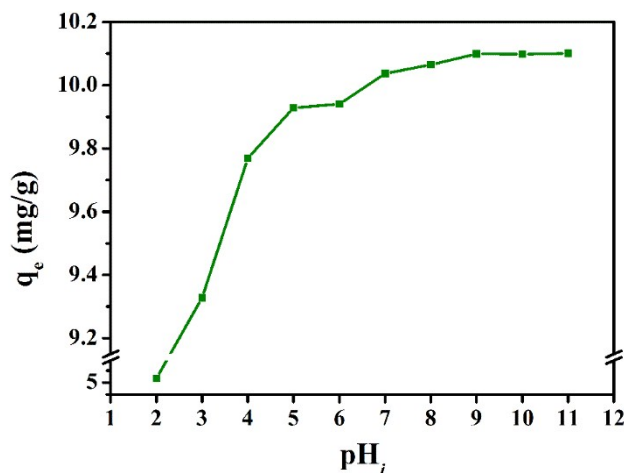
**Figure S6.** Effect of $pH_i$ on adsorption of As(V) by BiOBr.

**Table S1** Parameters of adsorption kinetics of Cr(VI) onto BiOBr.

| Initial concentration (mg L$^{-1}$) | Pseudo-first-order equation | | | Pseudo-second-order equation | | |
|---|---|---|---|---|---|---|
| | $q_e$ (mg g$^{-1}$) | $k_1$ (min$^{-1}$) | $R^2$ | $q_e$(mg g$^{-1}$) | $k_2$ (g (mg min)$^{-1}$) | $R^2$ |
| 10 | 11.05 | 0.67 | 0.9867 | 11.39 | 0.12 | 0.9995 |
| 20 | 19.44 | 0.39 | 0.8967 | 20.75 | 0.03 | 0.9651 |
| 30 | 23.12 | 0.25 | 0.8905 | 24.99 | 0.01 | 0.9681 |
| 40 | 26.16 | 0.25 | 0.8823 | 28.23 | 0.01 | 0.9639 |

**Table S2** Parameters of adsorption isotherms of Cr(VI) onto BiOBr.

| Langmuir | | | Freundlich | | |
|---|---|---|---|---|---|
| $K_L$(L mg$^{-1}$) | $q_m$(mg g$^{-1}$) | $R^2$ | $K_F$((mg g$^{-1}$)/(mg L$^{-1}$)$^{1/n}$) | n | $R^2$ |
| 2.85 | 32.50 | 0.9042 | 21.80 | 8.91 | 0.7891 |

**Table S3** XPS elemental analysis results of BiOBr, BiOBr (in DI water, pH=11) and BiOBr-Cr (in Cr(VI) solution, pH=11).

| | Elemental content (wt. %) | | | | | |
|---|---|---|---|---|---|---|
| | Bi | O | Br | Cr | C | N |
| BiOBr | 12.50 | 17.09 | 7.44 | 0 | 54.97 | 8.00 |
| BiOBr(in DI water) | 15.38 | 22.40 | 5.41 | 0 | 50.06 | 6.75 |
| BiOBr-Cr | 8.91 | 20.56 | 1.50 | 1.12 | 64.05 | 3.86 |

**Table S4** The adsorption energies of Br$^-$, OH$^-$, and CrO$_4^{2-}$ on BiOBr and BiOBr$_{1-x}$(OH)$_x$.

| Adsorbent | Br$^-$ | OH$^-$ | CrO$_4^{2-}$ |
|---|---|---|---|
| BiOBr | −4.38 eV | −4.86 eV | −4.72 eV |
| BiOBr$_{1-x}$(OH)$_x$ | −4.45 eV | −4.93 eV | −4.89 eV |