Electronic Supplementary Information (ESI)

# Enhancing Effect of Bisulfite on Sequestration of Selenite by Zerovalent Iron

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Number of pages (including this page): 11

Number of Figures: 7

## Summary

Fe $k^3$-weighted EXAFS spectra (Data were given as % values). (Page S11)

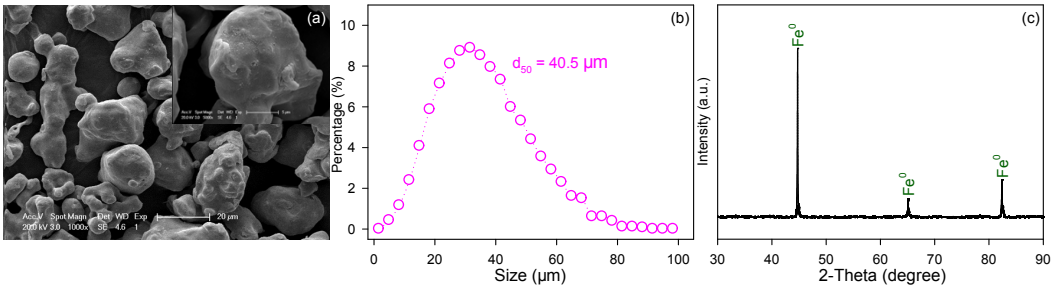


**Figure S1.** SEM (a), particle size distribution (b) and XRD (c) of the pristine ZVI employed in this study.

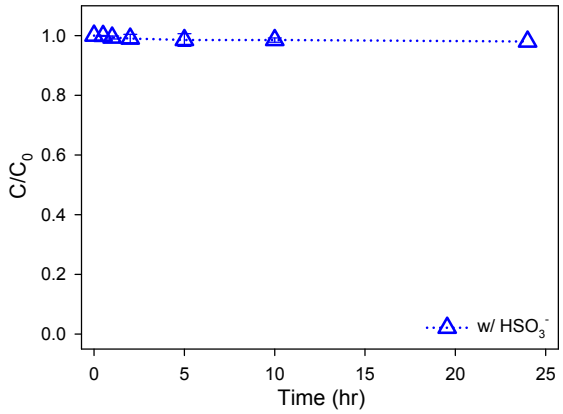


**Figure S2.** The effect of $HSO_3^-$ on the transformation of Se(IV). Reaction conditions: $[Se(IV)]_0$ = 10.0 mg $L^{-1}$, $[HSO_3^-]_0$ = 2.0 mM, $[pH]_{ini}$ = 5.0, $V_{air}$ = 2.0 mL.

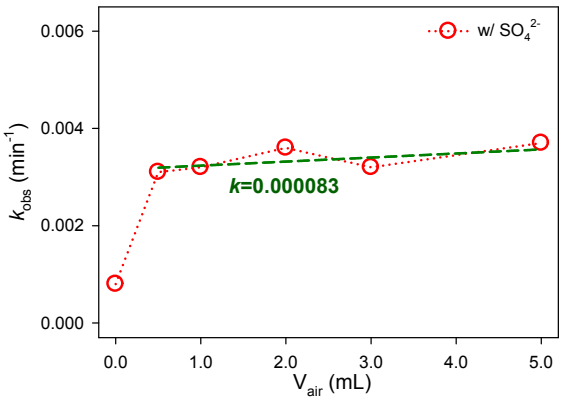


**Figure S3.** Correlation of Se(IV) removal rate with the headspace ($V_{air}$) in the presence of $SO_4^{2-}$. Reaction conditions: $[Fe^0]$ = 2.0 mM, $[Se(IV)]_0$ = 10.0 mg $L^{-1}$, $[SO_4^{2-}]_0$ = 2.0 mM, $pH_{ini}$ = 5.0.

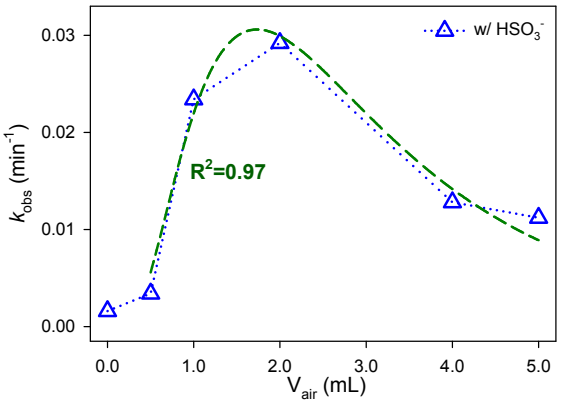


**Figure S4.** Correlation of Se(IV) removal rate with the headspace ($V_{air}$) in the presence of $HSO_3^-$. Reaction conditions: $[Fe^0]$ = 2.0 mM, $[Se(IV)]_0$ = 10.0 mg $L^{-1}$, $[HSO_3^-]_0$ = 2.0 mM, $pH_{ini}$ = 5.0.

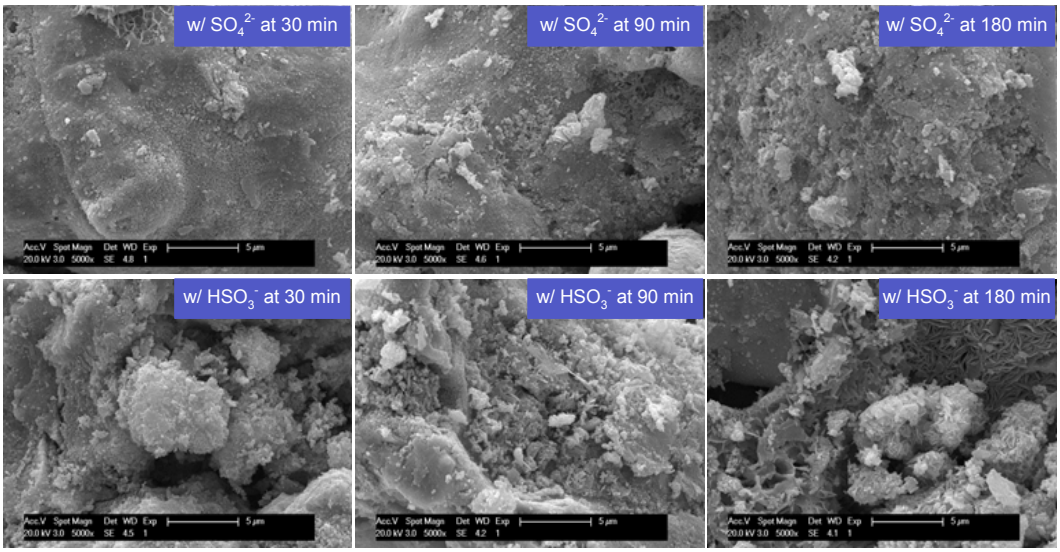


**Figure S5.** SEM images of the Se(IV)-treated ZVI corrosion products with the presence of $SO_4^{2-}$ or $HSO_3^-$ at different reaction time. Reaction conditions: $[Fe^0]$ = 2.0 mM, $[Se(IV)]_0$ = 10.0 mg $L^{-1}$, $[SO_4^{2-}/HSO_3^-]_0$ = 2.0 mM, $pH_{ini}$ = 5.0, $V_{air}$ = 2.0 mL.

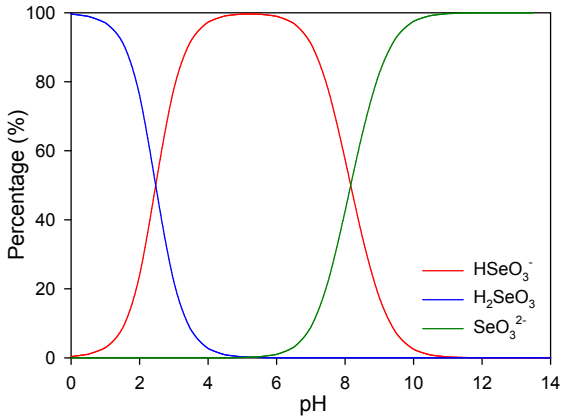


**Figure S6.** Theoretical calculation of the distribution of Se(IV) at variable pH.

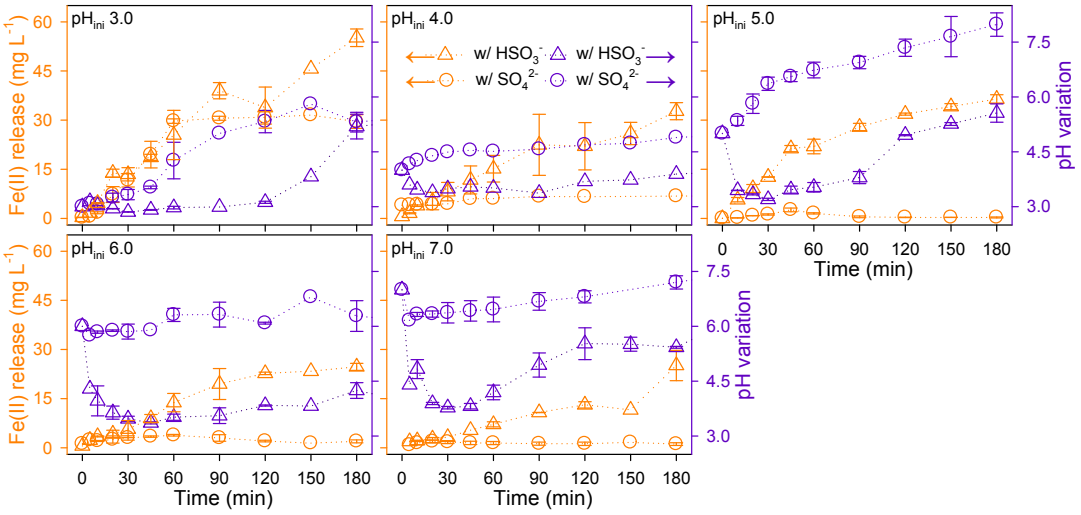


**Figure S7.** Variations in dissolved Fe(II) and pH during Se(IV) removal by ZVI at various $pH_{ini}$ levels. Reaction conditions: $[Fe^0] = 2.0$ mM, $[Se(IV)]_0 = 10.0$ mg $L^{-1}$, $[HSO_3^-/SO_4^{2-}]_0 = 2.0$ mM, $V_{air} = 2.0$ mL.

**Table S1.** Speciation of Fe in Se(IV)-treated ZVI corrosion products based on LCF of Fe $k^3$-weighted EXAFS spectra (Data were given as % values).

| Sample ID | Material References | | | | | | |
|---|---|---|---|---|---|---|---|
| | $Fe^0$ | Wustite | Magnetite | Ferrihydrite | Lepidocrocite | Goethite | Maghemite |
| w/ $SO_4^{2-}$ | 19.1 | 20.4 | 43.0 | 9.5 | 8.0 | -- | -- |
| w/ $HSO_3^-$ | 5.4 | 8.2 | 57.7 | -- | 19.4 | -- | 9.3 |