Supplementary Information for
Quantitative detection of hydroxyl radicals in Fenton system by UV-Vis spectrophotometry

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In these experiments, the expected concentration of MSIA was 100mM, and FBBs/MSIA=50. FeSO$_4$·7H$_2$O and the cations or anions was added before extraction, and the concentration of FeSO$_4$ in the systems was 200mM. The extraction time was 300s. Fe$_2$(SO$_4$)$_3$, Na$_2$SO$_4$, K$_2$SO$_4$ were adopted to examine the influence of Fe$^{3+}$, Na$^+$, K$^+$ on the test, and Fe(NO$_3$)$_3$, FeCl$_2$ were adopted to examine the influence of NO$_3^-$, Cl$^-$ on the test. However, high concentration of Fe$_2$(SO$_4$)$_3$ made the solution muddy, Fe(NO$_3$)$_3$ was used to instead of Fe$_2$(SO$_4$)$_3$ when we examined the influence of Fe$^{3+}$ at the concentration of 20mM. The influence of NO$_3^-$, Cl$^-$ on the test is shown in Fig. S1 and the influence of on the test is shown in Fig. S2.

It can be seen from Fig. S1 that NO$_3^-$ does not have an obvious influence on the test result of diazosulfones, even though the concentration of NO$_3^-$ is 20mM. Cl$^-$ does not have an obvious influence on the test when the concentration of Cl$^-$ is low(500μM), however, the absorbance of diazosulfones(425nm) disappears when the concentration of Cl$^-$ is 20mM. Consequently, the modified method is not appropriate for the system contains high concentration of Cl$^-$. From Fig. S2, it can be seen that Na$^+$ and K$^+$ do not affect the test result of diazosulfones obviously, even though the concentrations of Na$^+$ and K$^+$ are 20mM. Low concentration of Fe$^{2+}$ does not have an obvious influence on the test, however, high concentration of Fe$^{3+}$ leads to the increase of extraction time, and the absorption peak keeps 425nm. The absorbance of diazosulfones with extracting 480s after adding 20mM of Fe$^{3+}$ is the same as that with extracting 300s before adding Fe$^{3+}$. When we tested ·OH concentration in Fenton system, the concentration of Fe$^{3+}$ was equal to that of ·OH. After the addition of 20.00mL of H$_2$O$_2$(250μM) in to 80.00mL of Fe$^{2+}$/DMSO solution, the final concentrations of Fe$^{3+}$ were expected to be 50.0μM. under this circumstance, Fe$^{3+}$ did not have an obvious influence on the test.

\[ \text{Fe}^{2+} + \text{H}_2\text{O}_2 \rightarrow \text{Fe}^{3+} + \cdot\text{OH} + \cdot\text{OH}^- \]

![Fig. S1 Influence of NO$_3^-$, Cl$^-$ on the test](image)
Fig. S2 Influence of Fe$^{3+}$, Na$^+$, K$^+$ on the test