

Supporting Information

The Highly Efficient Removal of Hexavalent Chromium in Aqueous Solutions via Chemical Reduction of Plate-like Micro/nanostructured Zero Valent Iron

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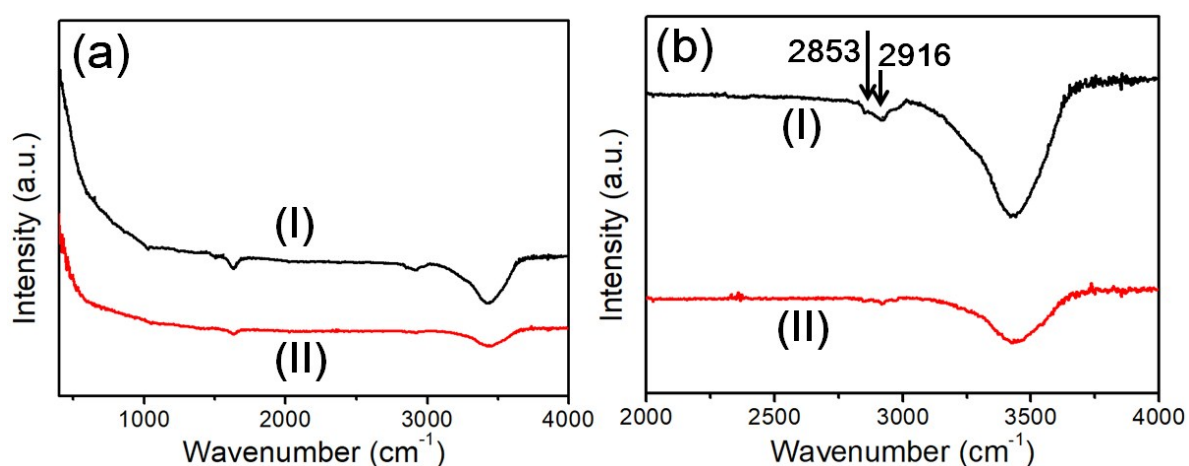


Figure S1. The FTIR spectra of the ball-milled powders before (I) and after (II) cleaning with NaOH solution. (b): The magnified figure of (a).

It has been shown that for the ball-milled powders without cleaning there exist the peaks at 2853 cm⁻¹ and 2919cm⁻¹ (curve I) which are attributed to C-H stretching bonds from the stearic acid [Ref.1]. After cleaning with NaOH solution, these two peaks basically disappear (curve II).

[Ref.1] C.P. Devatha, A. K. Thalla and S. Y. Katte, *J. Clean. Prod.*, 2016, **139**, 1425-1435.

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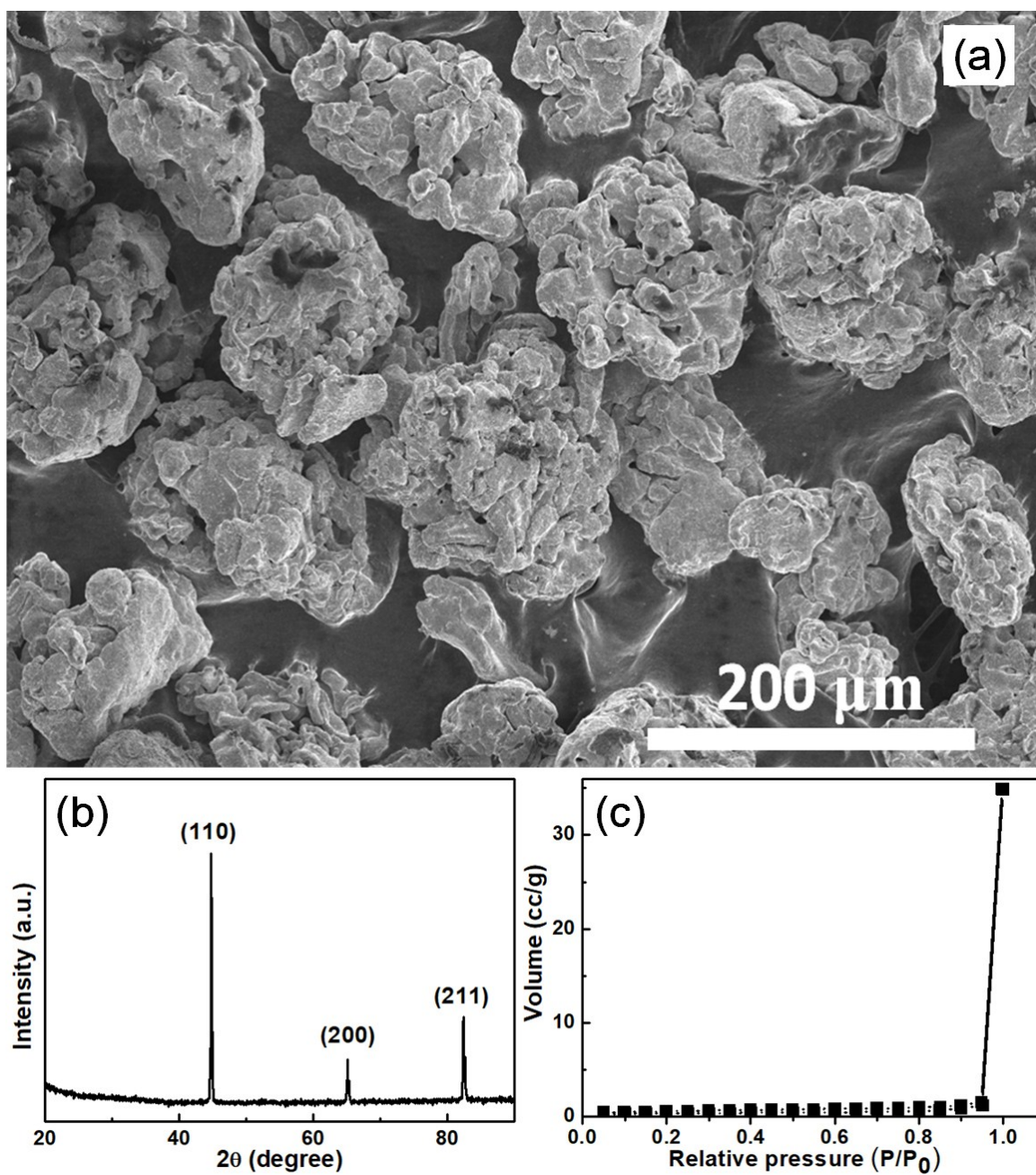


Figure S2. The FESEM image (a), the XRD pattern (b) and the nitrogen isotherm (c) of the non-ball milled sample (or the CZVI powders). The indexes in (b) correspond to the diffraction of pure iron.

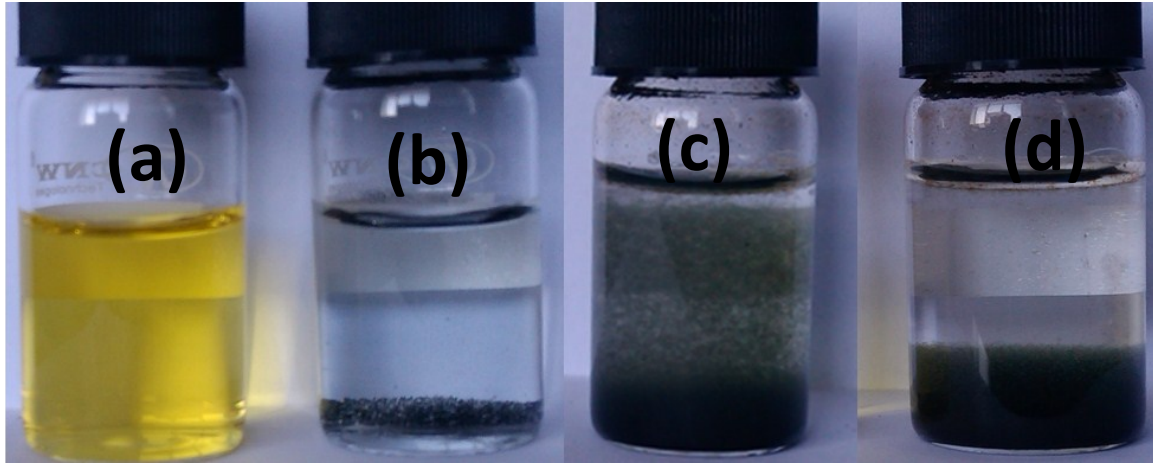


Figure S3. The photos of a sample in the different stages. (a): The initial Cr(VI)-contained solution without addition of ZVI. (b): After addition of the plate-like MNZVI for 12min and then magnetic separation. (c): After addition of NaOH (flocculant) into (b); (d) After holding the bottle in (c) for 5 min.

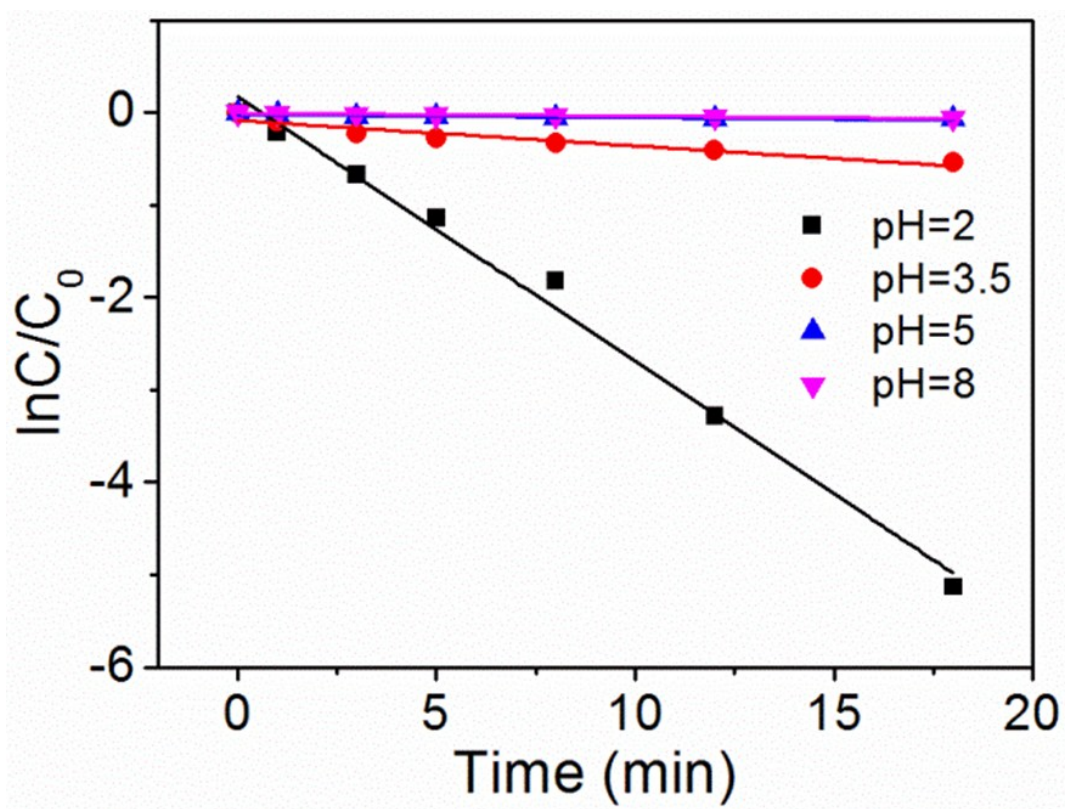


Figure S4. The plots of $\ln[C/C_0]$ vs the reaction time after adding 1.5 g/L ZVI into the solutions with 100 ppm in the initial Cr(VI) content but different initial pH values. The straight lines are the fitting results according to Eq.(1).

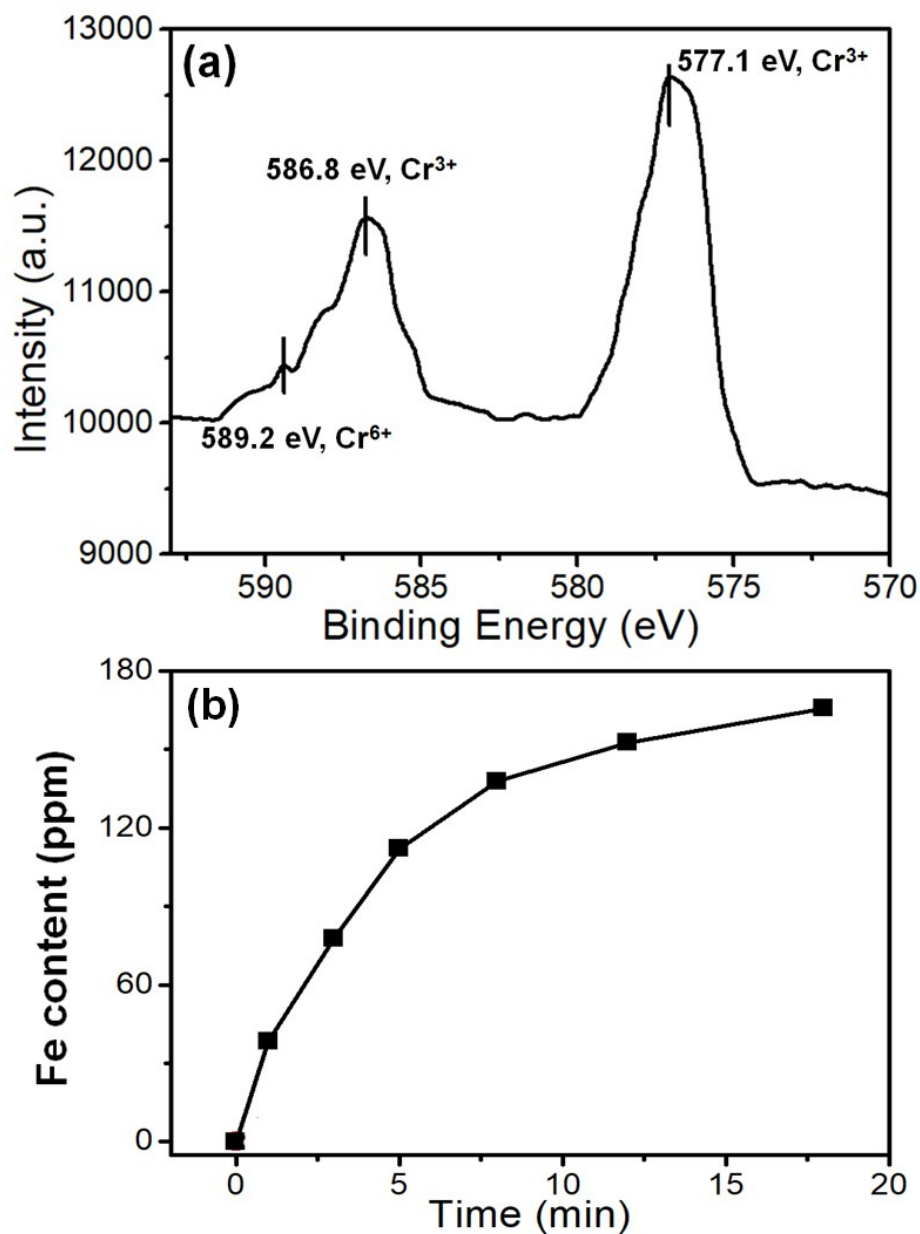


Figure S5. (a): The XPS spectrum (Cr2P) for the MNZVI after immersion in the Cr(VI)-contained solution for 18 min. (b): The Fe content in the Cr(VI)-contained solution as a function of the reaction time after the addition of the MNZVI. (The initial Cr(VI) content: 100 ppm; the MNZVI dosage: 1.5 g·L⁻¹)

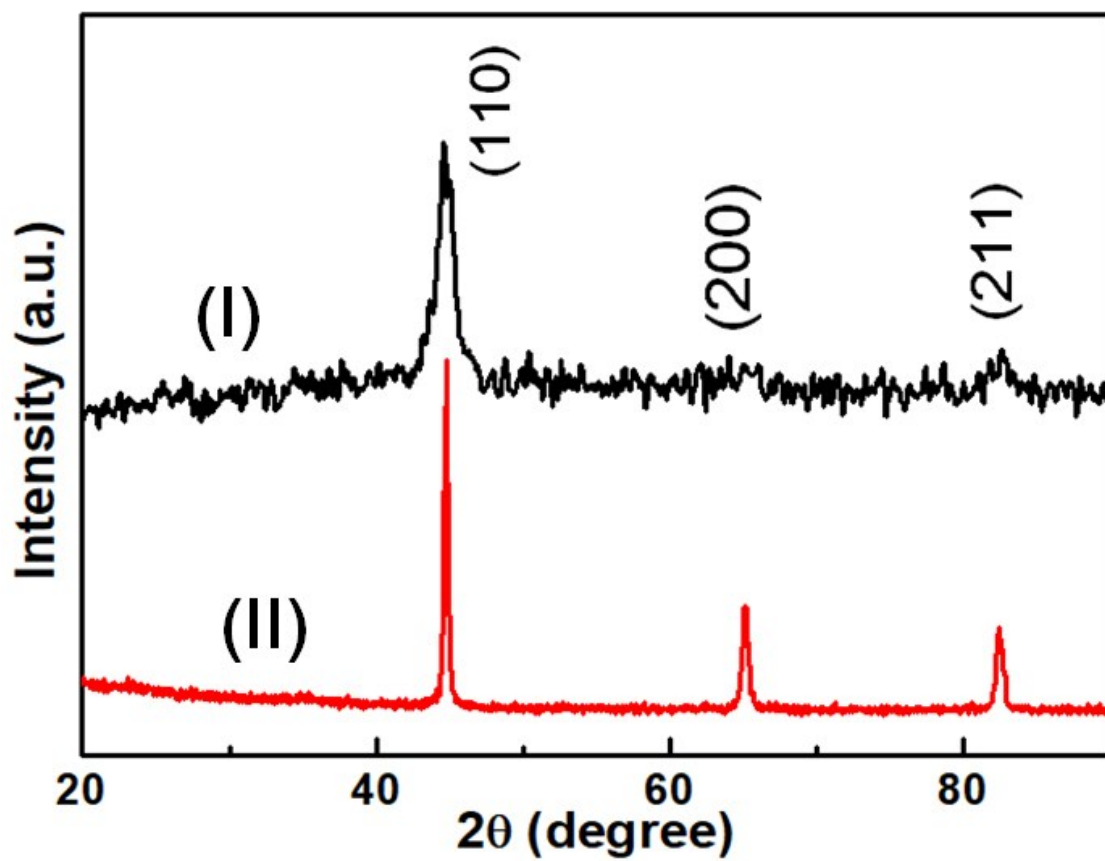


Figure S6. The XRD patterns of the plate-like MNZVI before (I) and after (II) immersion in the Cr(VI) -contained solution for 18 min. The indexes correspond to the diffraction of pure iron. (The initial Cr(VI) content: 100ppm; the MNZVI dosage: $1.5 \text{ g}\cdot\text{L}^{-1}$).