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One-step facile hydrothermal synthesis of flowerlike Ce/Fe bimetallic oxides for efficient As(V) and Cr(VI) remediation: Performance and mechanism

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Abstract: Toxic heavy metals As(V) and Cr(VI) removal from water environment has becoming more and more urgent due to their adverse health effect. In this study, the flowerlike Ce/Fe bimetallic oxides (CFBO), which combined the superiority of three-dimensionally (3D) hierarchical architectures and bimetallic synergistic effect, were innovatively designed and synthesized via one-step facile template-free hydrothermal method. Compared with pure iron oxides (PIO), the obtained CFBO exhibited excellent performance for As(V) and Cr(VI) removal, and the maximum adsorption capacities toward As(V) and Cr(VI) increased from 49.09 mg/g to 164.94 mg/g and 38.07 mg/g to 127.42 mg/g, respectively. Both As(V) and Cr(VI) removal efficiency decreased with an increasing solution pH due to the pH_{zpc} of CFBO, but exhibited slightly change with coexisting anions except for SiO_3^{2-} and PO_4^{3-} ions.