

Supporting Information for

Inhibition of Uranium(VI) Sorption on
Titanium Dioxide by Surface Iron(III) Species
in Ferric Oxide/Titanium Dioxide Systems

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(6 pages, 6 Figures)

Figure S1. Sequential extraction results for Fe(III) (oxyhydr)oxide/TiO₂ binary systems. TAO represents the amorphous Fe(III) oxide content as determined from a Tamm's acid oxalate (TAO) extraction whereas CDB represents the quantity of crystalline Fe(III) (oxyhydr)oxides as determined from a citrate-dithionite-bicarbonate (CDB) extraction. The extractions were performed on solids after a U(VI) sorption experiment at pH 5.25.

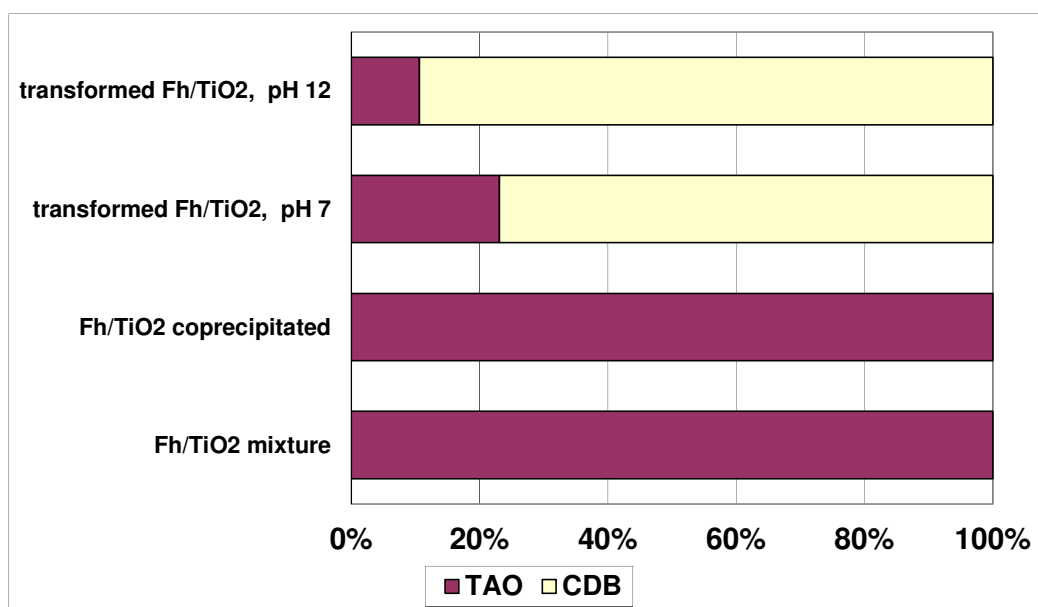


Figure S2a. TEM image for the Fh/TiO₂ co-precipitated mixture after completion of a sorption experiment at pH 5.5. At this pH, no dissolution of Fh is expected.

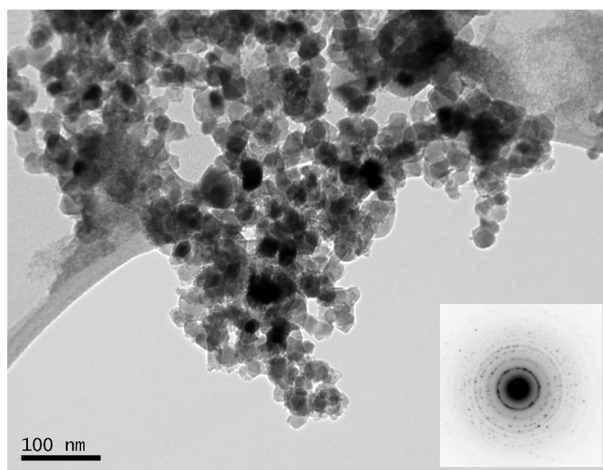


Figure S2b. TEM image for the Fh/TiO₂ physical mixture after completion of a sorption experiment at pH 5.5. At this pH, no dissolution of Fh is expected.

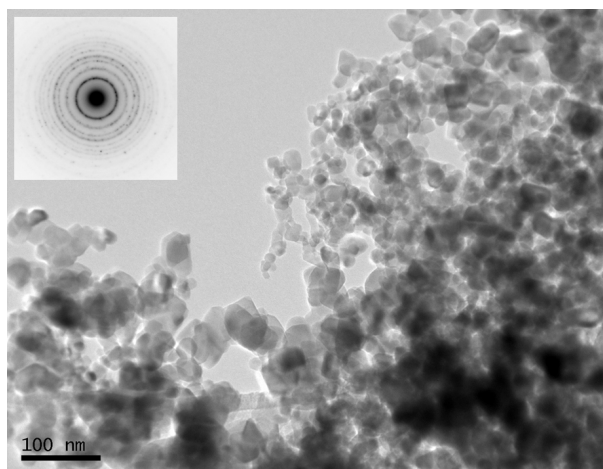


Figure S2c. TEM image for the transformed Fh/TiO₂ co-precipitated mixture where this mixture was aged for one week at pH 12 and 70 °C.

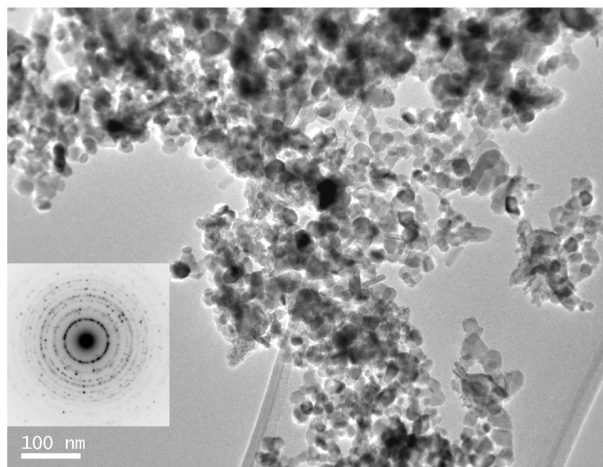
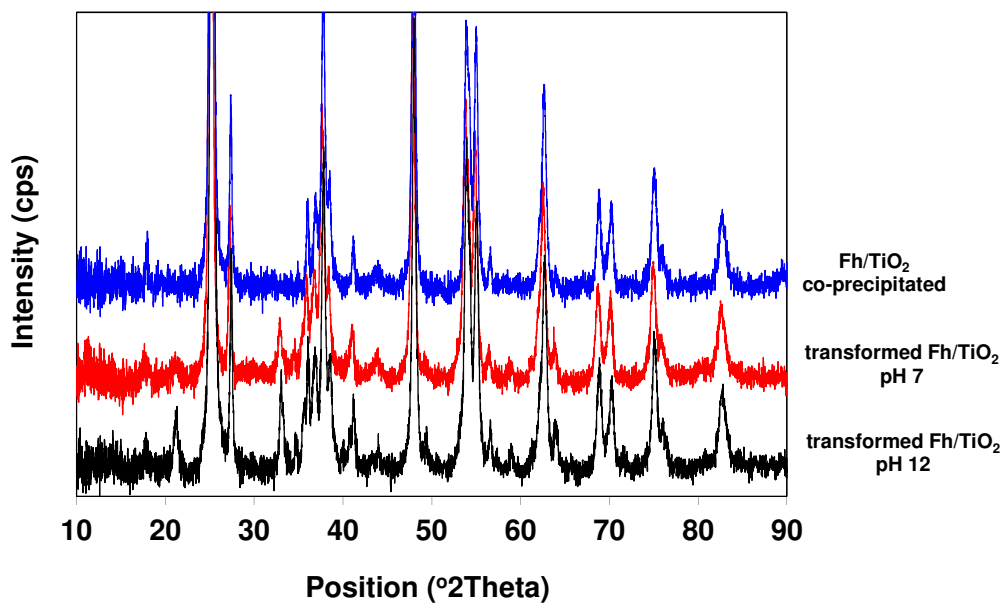


Figure S3. X-ray diffractograms of the Fe(III) (oxyhydr)oxide/TiO₂ binary systems.



The peaks observed for the ferrihydrite (Fh)/TiO₂ co-precipitated system (blue) are the XRD peaks for TiO₂. For the transformed Fh/TiO₂ systems, the peak at 21(2 θ) is due to goethite and the peak at 33(2 θ) is due to hematite. The diffractograms indicate that hematite and goethite are more dominant for the mixed oxide system containing Fh aged at pH 12 (black) compared to the mixed oxide system containing Fh aged at pH 7 (red).

Figure S4. Theoretical single scattering phase and amplitude functions of Fe-Fe and Fe-Ti pathways with identical parameters ($S_0^2 = 1$, $\Delta E = 0$, $\sigma^2 = 0.003$, $R = 3$ Å).

