



Indefinitely stable iron(IV) cage complexes formed in water by air oxidation.

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Streszczenie

In nature, iron, the fourth most abundant element of the Earth's crust, occurs in its stable forms either as the native metal or in its compounds in the +2 or +3 (low-valent) oxidation states. High-valent iron (+4,+5,+6) compounds are not formed spontaneously at ambient conditions, and the ones obtained synthetically appear to be unstable in polar organic solvents, especially aqueous solutions, and this is what limits their studies and use. Here we describe unprecedented iron(IV) hexahydrazide clathrochelate complexes that are assembled in alkaline aqueous media from iron(III) salts, oxalodihydrazide and formaldehyde in the course of a metal-templated reaction accompanied by air oxidation. The complexes can exist indefinitely at ambient conditions without any sign of decomposition in water, nonaqueous solutions and in the solid state. We anticipate that our findings may open a way to aqueous solution and polynuclear high-valent iron chemistry that remains underexplored and presents an important challenge.

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