Answer on the question #62287, Chemistry / General Chemistry

Question:
How does Mn (IV) become Mn (II) in reaction?

Answer:
The half-reaction of Mn(IV) reduction is simple:

$$Mn^{+4} + 2e^{-} \rightarrow Mn^{+2}$$

Then, different reactants can be used to reduce Mn(IV) to Mn(II). Firstly, one should note that Mn(IV) exists in nature manually in the form of Mn(IV) dioxide MnO2.

For example, the MnO2 can react with hydrogen chloride:

$$MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$$

There, Mn(IV) becomes Mn(II).

One more example:

$$3MnO_2 + S + 4H^{+} \rightarrow SO_4^{2-} + 3Mn^{2+} + 2H_2O$$

The reaction above is catalyzed by bacteria *D. desulfuricans.* This activity is not only of significance for the marine manganese cycle but also presents an important mechanism by which sulfate can be regenerated from reduced forms of sulfur anaerobically in the dark in marine sulfur cycle .

Materials:

1. Geomicrobiology, Fifth Edition. Henry Lutz Ehrilch, Dianne K. Newman 2009, Taylor & Francis group.