Answer on Question #70565 – Chemistry – Other
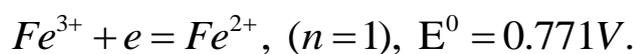
Task:

What will the oxidation potential of a ferrous-ferric system in which a ratio (Fe⁺⁺)/(Fe⁺⁺⁺) is 10?

Solution:

Iron (II) ions are easily oxidized to iron (III) ions, and iron (III) ions are easily reduced to iron (II) ions. The equilibrium we are interested in this time is:

$$Fe^{3+} + e = Fe^{2+}, \ (n=1), \ E^0 = 0.771V.$$

Nernst equation for ferrous-ferric system:

$$E = E^0 - \frac{RT}{nF} \ln \left({a_{red}} \middle/ {a_{ox}} \right);$$

$$E = E^0 - \frac{0.0592}{n} \lg \left(\frac{[Fe^{2+}]}{[Fe^{3+}]} \right);$$

$$\mathrm{E} = 0.771\,\mathrm{V} - \frac{0.0592}{1} \lg(10) = 0.7118\,\mathrm{V} \approx 0.712\,\mathrm{V}.$$

Answer: E = 0.712 V.