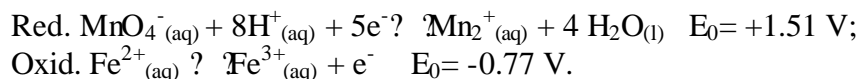


Chem 315, Fall 2001
Answers to Problem Set #6

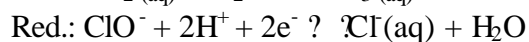
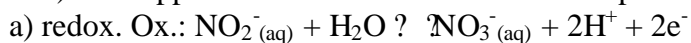
6.1.) Under the standard conditions, permanganate can oxidize Fe²⁺ because of positive potential.



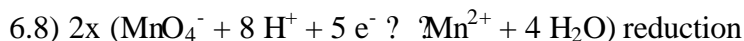
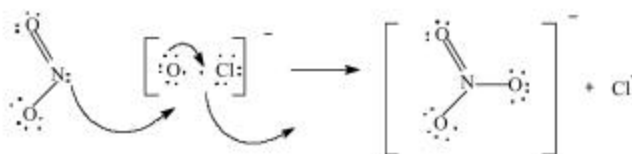
However, in the presence of HCl (Cl⁻ ions), there is a competing reaction of oxidation of Cl⁻ to Cl⁰: $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ $E_0 = -1.36 \text{ V}$. Addition of phosphate ion stabilizes the Fe³⁺ ion (shifts the equilibrium to the right), making the oxidation of Fe²⁺ more favorable. Addition of Mn²⁺ (basic oxide), makes the reaction of oxidation of Cl⁻ less favorable.

6.3.) Since two possible reactions can take place (reduction of oxygen to water and to hydrogen peroxide), it is likely for reaction to proceed in two steps. This makes the reaction to be slower.

6.7.) Two approaches to the same reactions are possible: redox and nucleophilic attack.



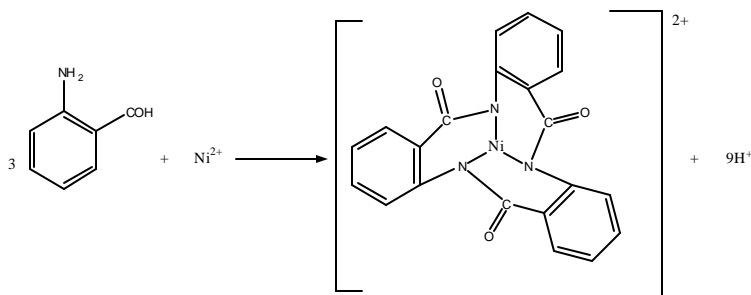
b) nucleophilic attack:



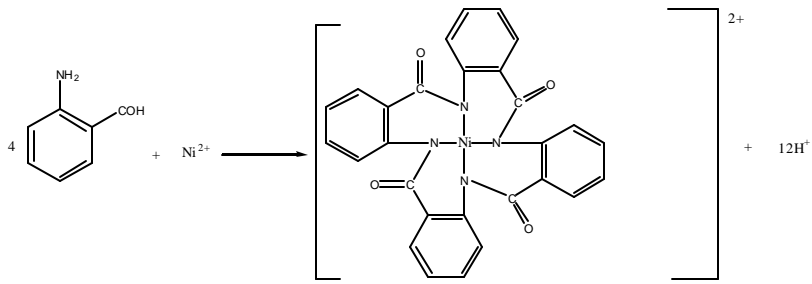
pH decreases as reaction proceeds to completion: as you can see, as H⁺ is consumed, H₂O is produced.

7.4) The yellow substance is most likely the mer-isomer. The assumptions made: 1 Rxn has a dissociative mechanism, 2 all NH₃ groups remain in the original positions.

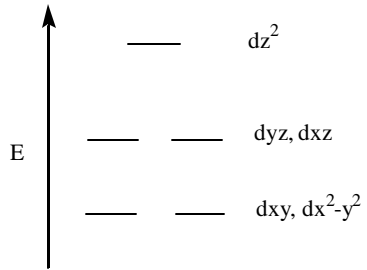
7.6) Triaza:



Tetraaza:



7.8)



7.11) 3 Isomers:

