

Redox Reactions in Solution

Predicting Redox Rxns (The normal way)

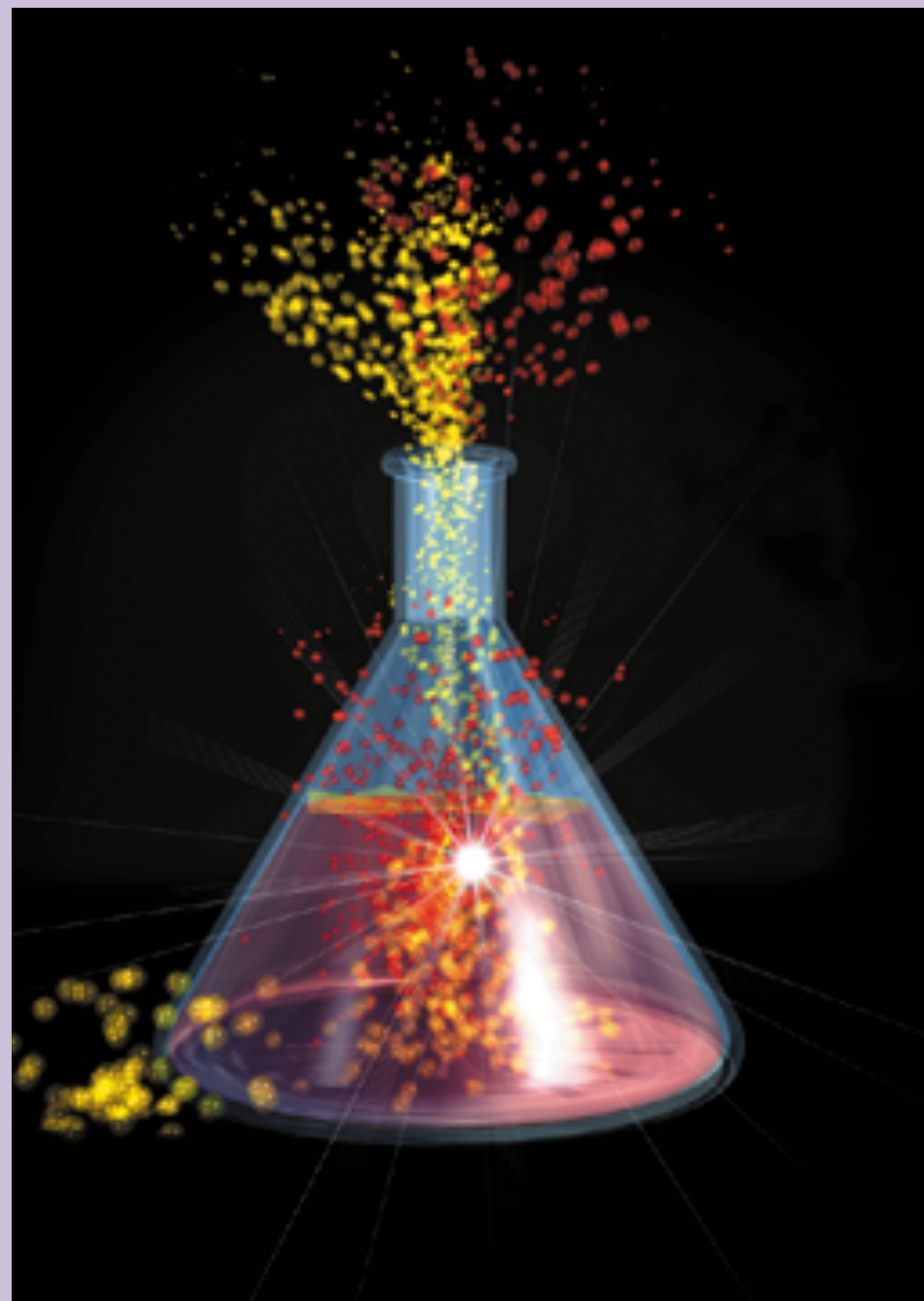
1. Identify all the entities present in the solution
2. Decide which are oxidizing agents and which are reducing agents

3. Remember oxidizing agents are on the left side of the table, reducing agents on the right

4. Strongest oxidizing agents are at the top, strongest reducing agents are at the bottom

5. Decide on the strongest oxidizing agents (and the strongest reducing agents)
6. Re-write the half reactions for each
7. Balance the electrons and charges

8. Add the half reactions together to produce the net equations



Example

- If solid copper is placed in nitric acid, what is the net ionic equation?
- What is the cell potential and is this reaction spontaneous or not?

Redox in Acid

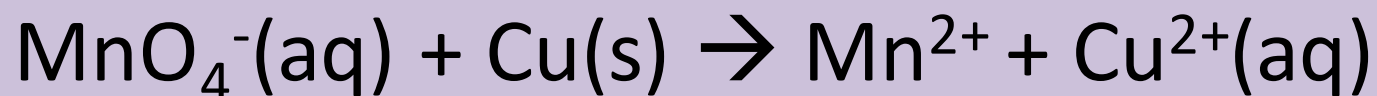
- Skeleton reactions can be used to predict a net ionic equation without using the redox table

- In acidic solution, after writing the half reactions, each one must be completed (through a series of steps)

1. Balance all atoms other than O and H
2. Balance O by adding $\text{H}_2\text{O}(\text{l})$ where necessary
3. Balance H by adding $\text{H}^+(\text{aq})$
4. Balance the electrons
5. Form the net equation

Example

- Given the following reaction occurs in an acidic solution, predict the net equation



Example 2

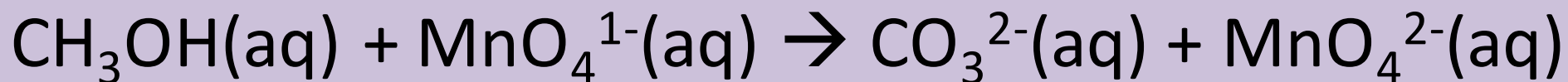
- Balance the following reaction that occurs in an acidic solution according to the information below:
- Silver metal is placed in a solution of acidified potassium dichromate. What is the balanced redox equation of the reaction?
 - $\text{Cr}_2\text{O}_7^{2-}(\text{aq}) + \text{Ag}(\text{s}) \rightarrow \text{Cr}^{3+}(\text{aq}) + \text{Ag}^+(\text{aq})$

Balancing in Base

- Follow the same steps to balance in acid
- After which you add OH^- to both sides to balance out the H^+ ions present.
 - The OH^- and H^+ form water

Example 3

Methanol reacts with permanganate ions in a basic solution. The main reactants and products are shown below. Balance the equation for this reaction.



Challenger Example 4 & 5 ;)

Balance in Acidic Solution:

