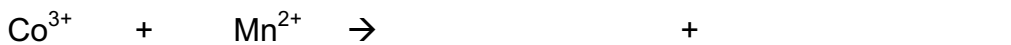


In Class 12: Redox Reactions

Assign the oxidation states of all the elements in the following compounds:



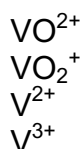
For the following incomplete redox reaction, fill in the blanks in the reaction with plausible products. **Label the oxidizing agent, reducing agent, and “conjugate” oxidizing agent and reducing agent. Your tables will help you predict possible products! Note that the reaction does not have to be balanced! Predict whether the reaction is favorable or not based on the reduction potentials.**



Explain the following statement related to redox using equations, calculations, and words!

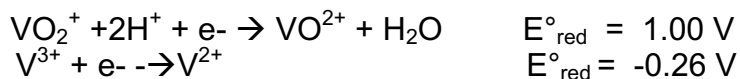
Cu metal “dissolves” (i.e. undergoes redox) in HNO₃ but not in HCl (note: upon dissolution a blue aqueous solution forms!).

Alternative energy such as solar power or wind power is an important way to potentially reduce greenhouse gas emission. However, for these power sources, supply doesn't always match demand (for instance there are cloudy days or nighttime when there is no solar energy is provided). Hence, there is a need for power back up in these situations. A recent issue of *New Scientist* (Jan 13, 2007, pg. 39) highlighted the use of chemical redox energy to store electricity and then release it during these off peak times. One such system that is in place at a wind farm on an island between the Australian mainland and Tasmania involves large vats containing the following species in aqueous solution:



For the species above, identify the oxidation state of each of the V's.

Consider the following half reactions from a table similar to the one in your book:



Using this information, propose a reaction of two of the four chemicals above that would produce electricity spontaneously through redox chemistry. In that reaction, identify what is being oxidized and what is being reduced and prove that it would create electricity spontaneously.

What reaction would occur at the anode of this very large battery?

What reaction would occur at the cathode of this battery?

When the wind power is generating electricity, some of that electricity is used to store more energy in the form of these chemicals. What reaction would occur in that case (note: because energy is being put into the system, it doesn't have to be a spontaneous reaction!)? Calculate the potential for the reaction under standard conditions.