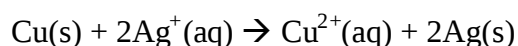


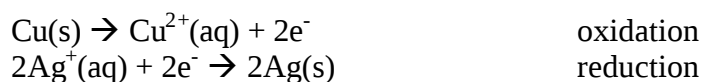
Summary: redox reactions and electrode potentials

Zinc provides the electrons which reduce Cu^{2+} to Cu, so we say that zinc is a **reducing agent**. Similarly, Cu^{2+} is an **oxidising agent**.

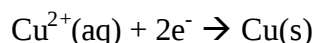
If copper is added to zinc sulphate solution no change is observed. Reaction does not occur in the reverse direction. Zinc reacts with copper ions, but copper ions do not react with zinc. However, if copper is added to silver nitrate(V) solution the copper does react. A grey precipitate forms, and the solution turns from colourless to blue. The overall reaction is



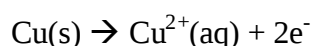
And the half-reactions are



No reaction is observed when silver is added to Copper(II) sulphate solution. Individual half-reactions are reversible. They can go either way.

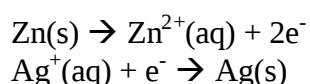


But copper atoms supply electrons to silver ions, so in this case the copper half-reaction is



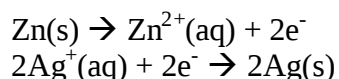
Combining half-equations

Once we know the direction in which each half-reaction will go, we can add together the half-equations to get an equation for the overall reaction. For example, if you add zinc to silver ions, the zinc atoms supply electrons to the silver ions. The half-equations are

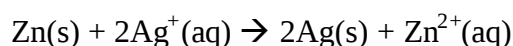


To combine the two half-equations together, we need to make sure the number of electrons is the same in each half-equation – because every electron released by a zinc atom must be accepted by a silver ion.

This means we have to multiply the silver half-equation by two so there are 2e^- in each half-equation:



Now we can add the two half-equations together to give the overall equation:



The 2e^- disappear because they are on both sides of the equation.