IRON(II) SULFATE AND POTASSIUM PERMANGANATE

In this demonstration, iron(II) sulfate solution is oxidised by potassium permanganate solution to give a solution of iron(III) and manganese(II).

The 4s electrons are lost before the 3d electrons to form the Period 4 transition metal ions. For example, the electron configurations in atomic iron and in the iron(II) cation are:

1. What is the oxidation number of manganese in MnO_4^- (also known as permanganate)? \( Mn^{7+} \)

2. The atomic configuration of manganese is below. Fill in the boxes for the configuration of manganese in permanganate?

3. In the diagram at the top of the page, note down the colours of the Fe^{2+}(aq) and MnO_4^- (aq) solutions. What colour do you think a mixture of the two solutions will give?

4. Fill in the electron configurations of the resultant Fe^{2+}(aq) and Mn^{2+}(aq) ions below.

**Challenge Question**

Balance the following redox equation:

\[ 5Fe^{2+} (aq) + MnO_4^- (aq) + 8H^+ (aq) \rightarrow 5Fe^{3+} (aq) + Mn^{2+} (aq) + 4H_2O (l) \]