

Colorful Oxidation States of Manganese

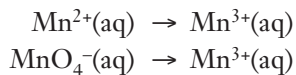
Oxidation State of Mn	Color	Molecule or Ion
+2	Pale pink	Mn^{2+}
+3	Rose color	Mn^{3+}
+4	Brown solid	MnO_2
+5	Blue	MnO_4^{3-}
+6	Green	MnO_4^{2-}
+7	Violet	MnO_4^-

Data Table

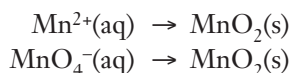
Well	Reactants	Observations	
		Initial Color	Final Color
A1	$Mn^{2+}(aq)$		
A2	$Mn^{2+}(aq) + MnO_4^-(aq) + H^+(aq)$		
A3	$Mn^{2+}(aq) + MnO_4^-(aq)$		
B1	$MnO_4^-(aq)$		
B2	$MnO_4^-(aq) + SO_3^{2-}(aq) + OH^-(aq)$		
B3	$MnO_4^-(aq) + OH^-(aq)$		

Based on your observations and the table of manganese oxidation states, balance the following reactions.

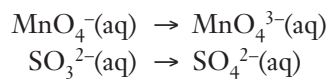
- In well A2, potassium permanganate is added to an acidified solution of manganese(II) sulfate. Explain the color of the product. Balance the following half-cell reactions and write the overall balanced equation for the reaction.



- In well A3, potassium permanganate is added to manganese(II) sulfate. Explain the color of the product. Balance the following half-cell reactions and write the overall balanced equation for the reaction.



3. In well B2, sodium sulfite is added to a basic potassium permanganate solution. Explain the color of the product. Balance the following half-cell reactions and write the overall balanced equation for the reaction.



4. In well B3, a concentrated sodium hydroxide solution (caustic) is added to potassium permanganate. Explain the color of the product. Balance the following half-cell reactions and write the overall balanced equation for the reaction.

