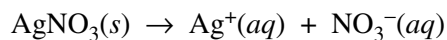


2005 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS

8. The dissolving of $\text{AgNO}_3(s)$ in pure water is represented by the equation above.

- (a) Is ΔG for the dissolving of $\text{AgNO}_3(s)$ positive, negative, or zero? Justify your answer.
- (b) Is ΔS for the dissolving of $\text{AgNO}_3(s)$ positive, negative, or zero? Justify your answer.
- (c) The solubility of $\text{AgNO}_3(s)$ increases with increasing temperature.
 - (i) What is the sign of ΔH for the dissolving process? Justify your answer.
 - (ii) Is the answer you gave in part (a) consistent with your answers to parts (b) and (c) (i) ? Explain.

The compound NaI dissolves in pure water according to the equation $\text{NaI}(s) \rightarrow \text{Na}^+(aq) + \text{I}^-(aq)$. Some of the information in the table of standard reduction potentials given below may be useful in answering the questions that follow.

Half-reaction	E° (V)
$\text{O}_2(g) + 4 \text{H}^+ + 4 e^- \rightarrow 2 \text{H}_2\text{O}(l)$	1.23
$\text{I}_2(s) + 2 e^- \rightarrow 2 \text{I}^-$	0.53
$2 \text{H}_2\text{O}(l) + 2 e^- \rightarrow \text{H}_2(g) + 2 \text{OH}^-$	-0.83
$\text{Na}^+ + e^- \rightarrow \text{Na}(s)$	-2.71

- (d) An electric current is applied to a 1.0 M NaI solution.
 - (i) Write the balanced oxidation half-reaction for the reaction that takes place.
 - (ii) Write the balanced reduction half-reaction for the reaction that takes place.
 - (iii) Which reaction takes place at the anode, the oxidation reaction or the reduction reaction?
 - (iv) All electrolysis reactions have the same sign for ΔG° . Is the sign positive or negative? Justify your answer.

END OF EXAM