

## Answer on Question #77037 - Chemistry - Physical Chemistry

Question:

For the reaction

$4\text{Ag}(s) + \text{O}_2(g) = 2\text{Ag}_2\text{O}(s)$  at 25 °C and 1 atm pressure,

$\Delta H$  is -61140 J and  $\Delta S$  is 132 J/K.

Assuming that  $\Delta H$  and  $\Delta S$  are essentially temperature independent, which of the following statements is true?

A) The reaction will not be spontaneous at any temperature.

B) The reaction will be spontaneous at all temperatures.

C) The reaction will be spontaneous at low temperatures, and the reverse reaction will be spontaneous at high temperatures.

D) The reaction will be spontaneous at high temperatures, and the reverse reaction will be spontaneous at low temperatures.

E) The change in entropy is the driving force at low temperatures.

**Solution:**

$$\Delta G = \Delta H - T\Delta S;$$

If  $\Delta G < 0$  = The reaction will be spontaneous at all temperatures.

$$\Delta G = -61140 - 132 * T = < 0 \text{ J}$$

So correct answer – B).

**Answer:** B) The reaction will be spontaneous at all temperatures.