

Marks
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- Consider the reaction $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$

$\Delta H^\circ = -198.4 \text{ kJ mol}^{-1}$ and $\Delta S^\circ = -187.9 \text{ J K}^{-1} \text{ mol}^{-1}$ at 25°C .

Show that this reaction is spontaneous at 25°C .

If the volume of the reaction system is increased at 25°C , in which direction will the reaction move?

Calculate the value of the equilibrium constant, K , at 25°C .

$K =$

Assuming ΔH° and ΔS° are independent of temperature, in which temperature range is the reaction non-spontaneous?

Answer: