CHM4

1. Calculate the standard entropy change for the reaction

2Na(s)+Cl 2 (g)→2NaCl(s) \rm 2Na(s) + Cl_2(g)\rightarrow 2NaCl(s)

using the data from the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Substance** | ΔH ∘ f (kJ/mol) \Delta H^\circ_{\rm f} ~{\rm (kJ/mol)} | ΔG ∘ f (kJ/mol) \Delta G^\circ_{\rm f} ~{\rm (kJ/mol)} | S ∘ [J/(K⋅mol)] {S^\circ} ~{\rm [J/(K\cdot mol)]} |
| Na(s) \rm Na(s) | 0.00 | 0.00 | 51.30 |
| Cl 2 (g) \rm Cl_2(g) | 0.00 | 0.00 | 223.1 |
| NaCl(s) \rm NaCl(s) | -411.0 | -384.0 | 72.10 |

Express your answer to four significant figures and include the appropriate units.

1. - Use data from Appendix IIB in the textbook to calculate the equilibrium constants at 25 ∘ C for each reaction.2H 2 S(g)⇌2H 2 (g)+S 2 (g) Express your answer using two significant figures.I have provided the data below.

delta G for N2 - 0

delta H for N2 - 0

delta S for N2 - 191.6

delta G for O2 - 0

delta H for O2 - 0

S for O2 - 205.2

delta G for 2NO - 87.6

delta H for 2NO - 91.3

S for 2NO - 210.8

Consider the reaction:  
I 2 (g)+Cl 2 (g)⇌2ICl(g) {\rm{I}}_2 \left( g \right) + {\rm{Cl}}_2 \left( g \right)\; \rightleftharpoons \;2{\rm{ ICl}}\left( g \right)  
K p = K_{\rm{p}} =81.9 at 25 ∘ C ^\circ {\rm{C}}.  
Calculate ΔG rxn \Delta G_{{\rm{rxn}}}for the reaction at 25 ∘ C ^\circ {\rm{C}}under each condition:

Part A: standard conditions Express your answer using one decimal place and in kJ

Part B: at equilibrium

Part C:

P ICl = P_{{\rm{ICl}}} = 2.55atm {\rm atm};  
P I 2 = P_{{\rm{I}}_2 } = 0.315atm {\rm atm};  
P Cl 2 = P_{{\rm{Cl}}_2 } = 0.219atm {\rm atm}.

Express your answer using one decimal place and in kJ