

Solutions

2.1 A Use $\Delta G = \Delta H - T\Delta S$ with consistent energy units. A negative Gibbs energy change indicates thermodynamic favourability for the stated conditions, not a fast rate. An activation barrier can make a favourable process slow.

2.2 $\Delta G = \Delta H - T\Delta S = 30 - 400 \times 0.10 = -10 \text{ kJ/mol}$.

2.3 False. Thermodynamic favourability does not establish reaction rate. Celsius cannot replace kelvin in $T\Delta S$, and a unit conversion error can change the result by a factor of 1,000.

2.4 entropy. entropy means A state property related to energy dispersal and accessible arrangements.

3.1 Convert $\Delta S = 0.080 \text{ kJ/(K mol)}$; $T = 24/0.080 = 300 \text{ K}$. $\Delta G = +4 \text{ kJ/mol}$ at 250K and -8 at 400K. Thermodynamic favourability does not imply a fast reaction.