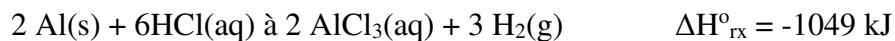


7) Calculate the reaction enthalpy of formation of anhydrous aluminum chloride,

$2 \text{Al(s)} + 3 \text{Cl}_2\text{(g)} \rightarrow 2 \text{AlCl}_3\text{(s)}$ from the following data:



Would you expect the equilibrium constant to rise or fall with increasing temperature for this reaction?

8) **Draw valid Lewis structures** for each of the following compounds: $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (propanol), $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ (butane), and $\text{CH}_3\text{CH}_2\text{OCH}_3$ (methyl-ethyl-ether) indicating for each molecule which Van der Waals forces are important.

- Rank the molecules in order of increasing vapor pressure at fixed temperature.
- Rank the molecules in order of increasing normal boiling point.
- Which molecule has the highest vapor pressure? Which has the lowest vapor pressure?
- Which molecule has the highest boiling point? Which has the lowest boiling point?

- 9) What is a “state” in chemistry? What is a “state property” or “state function”?
- 10) Give as many examples as you can of Chem 1A systems which are in a “state”.
- 11) State the 1st Law of Thermodynamics in at least 3 ways.
- 12) Write balanced “**molecular**”, **complete ionic**, and **net ionic chemical equations** for the following reactions:
- a) The neutralization of HCl by calcium carbonate to give calcium chloride, water, and carbon dioxide (TUMS reaction).
- b) The precipitation of lead iodide when a KI solution is added to a solution of $\text{Pb}(\text{NO}_3)_2$.