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#1. During combustion of 5. grams of liquid ethanol 35.5 kcal of energy is released, the sum of the coefficients of all of the products and reactants is?

#2. For the reaction described above how many grams of ethanol must be burned to release 450. kcal of energy?

#3. The production of polyvinyl chloride, a common type of plastic, takes place according to the reaction  $\text{Cl}_2(\text{g}) + \text{H}_2\text{C} = \text{CH}_2(\text{g}) \rightarrow \text{ClCH}_2\text{CH}_2\text{Cl}(\text{l})$  and the enthalpy change for the reaction is -52 kcal/mol. Is the change enthalpy positive or negative or nothing for this process?

#4. Is the reaction above described spontaneous at all temperatures?

#5. If a catalyst changes the activation energy of a forward reaction from 28.0 kcal/mol to 23.0 kcal/mol, what effect does it have on the reverse reaction?