

Friday worksheet 13

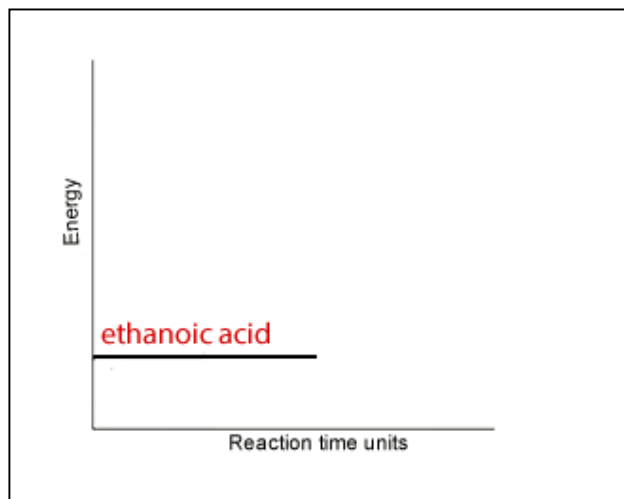
1) When considering complete combustion, the heat of combustion of ethanoic acid, $C_2H_4O_2$, is -876 kJ mol^{-1} and the heat of combustion of methyl methanoate, $C_2H_4O_2$, is -973 kJ mol^{-1} . The auto-ignition temperature (the temperature at which a substance will combust in air without a source of ignition, in other words, this temperature is required to supply the activation energy needed for combustion) of ethanoic acid is $485 \text{ }^\circ\text{C}$ and the auto-ignition temperature of methyl methanoate is $449 \text{ }^\circ\text{C}$.

a. Write the thermochemical equations for the complete combustion of:

- Methyl methanoate
- Ethanoic acid

b. Given the information above, draw the energy profiles of the two reactions if one mol of each substance undergoes complete combustion in a sealed container. The relative energy content of the ethanoic acid is given on the diagram below. Label the:

- ΔH and give its sign and magnitude.
- relative amount of activation energy (magnitude not required)



- relative energy value of products (magnitude not required)
- the difference in energy content, in kJ mol^{-1} , of the reactants between the two reactions