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**POST-LAB REPORT #2**

**Measuring the Vapor Pressure of a Volatile Liquid**

*1. Using your data show the calculation (with units) of  at one of the temperatures used in your Clausius Clapeyron plot.*

= = **103.93 kPa**

= = 23.6C = 23.6C + 273.15 = **296.75 K**

At range 23 – 27C:

* (range 23 – 27C) = 23.6C = 23.6C + 273.15 = **296.75 K**
* = **106.89 kPa**

= = = 103.93 kPa = **103.9 kPa**

*2. Using your data show the calculation (with units) of  at the temperature used in answering question 1.*

At range 23 – 27C:

* = **106.89 kPa**
* = **103.93 kPa**
* = – = 106.89 kPa – 103.93 kPa = 2.9600 kPa = **3.0 kPa**

*3. Using your data show the calculation (with units) of  in units of kJ/mole.*

Equation of straight line: **y = – 5231.43x + 18.8361**

Slope = = **– 5231.43 K**

= (5231.43 K)R = (5231.43 K)(8.3145 )() = 43.4967 kJ/mole = **43 kJ/mole**

*4. Ethanol has a normal boiling point of 78.3 °C. Why is the normal boiling point higher than methanol but lower than iso-propanol listed above? Would you expect the heat of vaporization of ethanol to follow the same trend? Explain completely but concisely.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Methanol** | **Ethanol** | **Iso-propanol** |
| **Formula** |  |  |  |
| **Molar mass** | 32.04 g/mol | 46.07 g/mol | 60.1 g/mol |

- According to the table, since Ethanol has a higher molar mass than Methanol, Ethanol has a higher boiling point than Methanol. However, since Ethanol has a lower molar mass than Iso-propanol, Ethanol has a lower boiling point than Iso-propanol.

- The heat of vaporization is the heat required for a molecule to go from liquid to gas phase. The higher the boiling point, the more energy required to vaporize. Hence, because Iso-propanol has the highest boiling point due to its highest molar mass among the three, I would expect it to have a higher heat of vaporization than that of Ethanol. Following the same trend as their normal boiling points, the heat of vaporization of Ethanol is higher than that of Methanol but lower than that of Iso-propanol.