

Vapor Density Lab

For each experiment, use ONE of the data points and the Ideal Gas Law to calculate the molar mass:

$$PV = nRT$$

$$n = PV/RT$$

$$R = 0.0821 \text{ atm-L/mol-K}$$

$$P = 101.6 \text{ kPa (see details above)}$$

$$V = 1.00 \text{ L}$$

$$T = \text{the temperature you select}$$

$$n = \text{the \# of moles}$$

Your answer will give you the number of moles (n)

Since $n = \text{mass/molar mass}$, you can calculate molar mass

$$\text{molar mass} = \text{mass} / n$$

Be sure to use the mass for the temperature you select!

Be sure to convert mass from mg to g!

Or you can do the calculation in one step:

$$\text{molar mass} = (\text{mass})PV/RT$$

Be sure to convert mass to g and use the corresponding temperature in K!

Then perform a percent error calculation, using the formula for the gas to determine the actual molar mass. You can research these online!

Acetone

Pentane

Hexane

Methanol

Ethanol

Ethyl Acetate

Ether