Answer on Question #83812 – Chemistry – General Chemistry

Question

A container of Carbon Dioxide has a pressure of $755mmHg$ at $325K$. If the temperaure is decreased to $295K$, what is the pressure of the gas in the container?

Solution

For comparing the sample of gas under two different conditions, the combined gas law can be used:

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}.$$

The volume of container does not change ($V_1 = V_2$), therefore it can be reduced:

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}\ (Gay - Lussac's\ law).$$

Then,

$$P_2 = \frac{P_1T_2}{T_1} = \frac{755mmHg \times 295K}{325K} \approx 685.3mmHg.$$

Answer: If the temperature equals $295K$, the pressure equals $685.3mmHg$.