Answer to the Question #47164 – Chemistry – Organic Chemistry

Question:

A tightly sealed 4.0 flask contains 884 mm Hg of N_2 at 94.0 ^{0}C the flask is cooled until the pressure is reduced 442 mm Hg. What is the temperature of the gas?

Answer:

Gay-Lussac's law states that the pressure of a gas varies directly with the Kelvin temperature, assuming that volume is constant (in our case the volume of flask is constant). We use the following formula:

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{884\, mm\, Hg}{94 + 273} = \frac{442\, mm\, Hg}{T_2}$$

Then $T_2 = 183.5\, K = -89.5\ ^0C$

Answer: -89.5 ^{0}C.