

Question #58870, Chemistry, General Chemistry

A gas with an initial pressure of 1.20 atm at 97°C is cooled to -31°C. What is the new pressure in the unit?

Express your answer with the appropriate units.

Answer:

$$pV = nRT$$

The volume during the experiment remained the same. That is why:

$$V = \frac{nRT}{p}$$

$$T_1 = 97 + 273 = 370 \text{ K}$$

$$T_2 = -31 + 273 = 242 \text{ K}$$

$$\frac{nR \cdot 370}{1.2} = \frac{nR \cdot 242}{p_2}$$

$$p_2 = \frac{(nR \cdot 242) \cdot 1.20}{nR \cdot 370} = 0.78 \text{ atm}$$