

Question #48241, Chemistry, Physical Chemistry

The plunger of a syringe is pulled out until the volume of air in the syringe is 30.0 mL at a pressure of 694 mm Hg. A stopper is then placed on the syringe so that no air can escape. What will be the air pressure inside the syringe if the plunger is depressed until the volume in the syringe is 26.0 mL?

Answer:

$$V_1 = 30.0 \text{ mL}$$

$$V_2 = 26.0 \text{ mL}$$

$$P_1 = 694 \text{ mm Hg}$$

$$P_2 = ?$$

$$pV = nRT$$

$$n = \text{const}$$

$$R = \text{const}$$

if this is an isothermal compression process, then

$$T = \text{const}$$

$$pV = \text{const}$$

$$p_1 V_1 = p_2 V_2$$

$$p_2 = p_1 \cdot V_1 / V_2$$

$$p_2 = 694 \cdot 30 / 26 = \mathbf{800.76} \text{ mm Hg}$$

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