Diffusion/Effusion Practice Problems

1. A sample of $N_{2\,(g)}$ diffuses 20.8 cm in 5.0 minutes. How far would a sample of $Kr_{(g)}$ diffuse in the same amount of time under the same conditions?

2. A sample of helium gas diffuses 15.0 cm in 3.0 minutes. How long would it take a sample of Cl_2 gas to diffuse a distance of 15.0 cm under the same conditions?

3. 3.2×10^{-3} moles of oxygen gas effuse from a container in 10.0 minutes. How many moles of CH_4 gas could effuse from the same container in 10.0 minutes under the same conditions?

4. A sample of neon gas effuses from a container at a rate of 2.18×10^{-2} moles per minute. In a separate trial, an unknown gas effuses from the same container at a rate of 8.66×10^{-3} moles per minute. What is the molar mass of the unknown gas?

5. Carbon monoxide gas effuses from a container in 3.8 minutes. The same quantity of an unknown gas effuses in 6.0 minutes under the same conditions. What is the molar mass of the unknown?

6. A sample of argon gas travels 12.0 cm in 2.0 minutes. A similar sample of an unknown gas travels 37.9 cm in 2.0 minutes. What is the molar mass of the unknown gas?

Answers:

1. 12.0 cm
2. 13 min
3. 4.5×10^{-3}
4. 128 g/mol
5. 70. g/mol
6. 4.00 g/mol