

Effusion and diffusion

Problem

$$\frac{\text{rate}_1}{\text{rate}_2} = \sqrt{\frac{m_2}{m_1}}$$

1. (last updated 5-18-04)
 (Brown378) An unknown gas composed of Homonuclear diatomic molecules effuses at a rate that is only 0.355 times that of O₂ at the same temperature. What is the identity of the unknown gas.

a) ? is more massive
 b) O₂ is moving fastest

$$\frac{0.355}{1 \text{ O}_2} = \sqrt{\frac{32 \text{ O}_2}{? ?}} \quad \text{Solve for ?}$$

? = 253 (I₂)

2. (last updated 5-18-04)
 (brady449) Under all of the Graham's law conditions, which effuses more rapidly and by what factor, ammonia or hydrogen chloride?

Nullify

	NH ₃	HCl
	↑	↑
	17 g/mol	36.45 g/mol
	↑	
	fastest	

True it is
 1/2 as massive
 so it will effuse faster.
Just NOT at a linear rate. Not linear

3. (last updated 5-18-04)
 (Kotz569) Tetrafluoroethylene, C₂F₄, diffuses through a barrier at a rate of 4.6E-6 mol/h. An unknown gas consisting of only boron and hydrogen, effuses at the rate of 5.8E-6 mol/h under the same conditions. What is the molar mass of unknown gas?

$$- = \sqrt{-} \quad \text{sub in values and solve}$$

63 g/mol