

## Answer on Question #70306, Chemistry / General Chemistry

If a molecule of neon gas travels at an average of 421 m/s at a given temperature, estimate the average speed of a molecule of butane gas (C<sub>4</sub>H<sub>10</sub>) at the same temperature.

Answer in units of m/s.

Answer

$$v_{\text{Ne}} = \sqrt{\frac{2RT}{M_{\text{Ne}}}} \quad v_{\text{C}_4\text{H}_{10}} = \sqrt{2RT/M_{\text{C}_4\text{H}_{10}}}$$

$$v_{\text{Ne}} \cdot \sqrt{M_{\text{Ne}}} = v_{\text{C}_4\text{H}_{10}} \cdot \sqrt{M_{\text{C}_4\text{H}_{10}}}$$

$$v_{\text{C}_4\text{H}_{10}} = 421 \cdot \frac{\sqrt{20}}{\sqrt{74}} = 219 \text{ m/s}$$

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