

Real Gases: Deviations from Ideality

$$\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$$

1. For the pair of gases below, predict which one would more closely follow the ideal gas law. Both gases are at $-20\text{ }^\circ\text{C}$ and 4.0 atm . Explain your answer.

Propane, C_3H_8 , boiling point = $-45\text{ }^\circ\text{C}$

Neon, Ne , boiling point = $-246\text{ }^\circ\text{C}$

2. Use both the van der Waals equation and the ideal gas law to calculate the pressure, in atm, of 6.75 moles of methane (CH_4) gas at a temperature of $525\text{ }^\circ\text{C}$, in a 4.86 L container.
3. Would you expect Ar or CO_2 gas to behave more like an ideal gas at higher pressures? (Hint: Look at their van der Waal constants)
4. Explain the differences between the van der Waal constants, a and b .