

Answer on Question #74739, Physics / Molecular Physics | Thermodynamics

Gas mixture containing 8 mole of oxygen and 2 moles of argon at room temperature. What is the total internal energy?

Solution:

$$U = \frac{n_1 f_1}{2} RT + \frac{n_2 f_2}{2} RT$$

f is the degrees of freedom

f₁ for a diatomic gas = 5

f₂ for a monoatomic gas = 1

Therefore,

$$U = \left(\frac{8 \text{ mol} \times 5}{2} + \frac{2 \text{ mol} \times 1}{2} \right) \times 8.31 \frac{\text{J}}{\text{Kmol}} \times 291 \text{ K} = 2.418 \text{ kJ} = 21 RT$$

Answer: 2.418 kJ o 21 RT

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