Answer on Question #50619, Physics, Molecular Physics | Thermodynamics

Work done by performing a reversible, isothermal compression of 2 moles of an ideal gas at T = 300K from V_1 = 2L to V_2 = 1L.

Solution:

In thermodynamics, the work involved when a gas changes from state 1 to state 2 is

$$W = \int_{V_1}^{V_2} pdV$$

For an isothermal, reversible process

$$W = nRT\ln\frac{V_2}{V_1}$$

Hence,

$$W = 2 * 8.31 * 300 * \ln 0.5 = -3456 \text{ J}$$

Answer: $W = -3456$ J