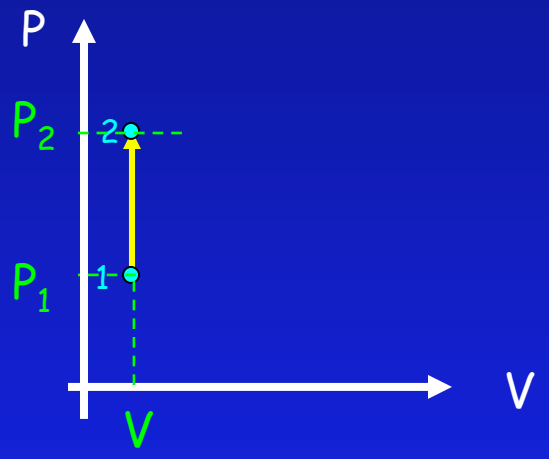
First Law of Thermodynamics Isochoric Example

2 moles of monatomic ideal gas is taken from state 1 to state 2 at constant volume $V=2m^3$, where $T_1=120K$ and $T_2=180K$. Find Q.



1. $Q = \Delta U - W$

2. $\Delta U = (3/2)\, nR\, \Delta T = 1500$ J

3. $W = -P\, \Delta V = 0$ J

4. $Q = \Delta U - W = 1500 + 0 = 1500$ J

requires less heat to raise T at const. volume than at const. pressure