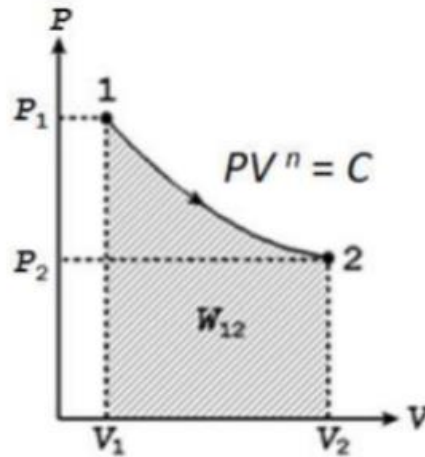# Answer on Question #71023, Physics / Molecular Physics | Thermodynamics

0.05 m³ of a gas at 6.9 bar expands reversibly in a cylinder behind a piston according to the law $PV^{1.2}$ =constant until volume is 0.08 m³. Calculate the work done by the gas and sketch the process on p-v diagram.

Solution:

$Work = shaded\ area$

Since,

$$p_1 V_1^{1.2} = p_2 V_2^{1.2},$$

Therefore

$$p_2 = p_1 \left(\frac{V_1}{V_2}\right)^{1.2} = 6.9 \times \left(\frac{0.05}{0.08}\right)^{1.2} = 3.92559\ bar$$

The work is

$$W = \frac{p_2 V_2 - p_1 V_1}{1 - n}$$

$$W = \frac{3.9256 \times 0.08 - 6.9 \times 0.05}{1 - 1.2} \times 10^5 = 15476\ J \approx 15480\ J$$

Answer: $15480\ J$