Answer on Question #73035, Physics / Molecular Physics | Thermodynamics

Two sphers A and B have diameters in ratio 1:2; densities in ratio 2:1; and specific heat in ratio 1:3. Find ratio of thermal capacity

Solution

$C = cm = c\rho V = \frac{4\pi r^3 c\rho}{3}$, where C – thermal capacity, c – specific capacity, ρ – density, V – volume.

Remove the constants:

C is proportional to $r^3 c\rho$.

$\frac{D_A}{D_B} = \frac{1}{2} \rightarrow \frac{r_A}{r_B} = \frac{1}{2} \rightarrow \frac{r_A^3}{r_B^3} = \frac{1}{8}$;

$\frac{c_A}{c_B} = \frac{1}{3}$;

$\frac{\rho_A}{\rho_B} = \frac{2}{1}$;

$\frac{C_A}{C_B} = \frac{r_A^3 c_A \rho_A}{r_B^3 c_B \rho_B} = \frac{1}{8} \times \frac{1}{3} \times \frac{2}{1} = \mathbf{\frac{1}{12}}$

Answer

The ratio of thermal capacities is **1:12.**