

Answer on Question #50145, Physics, Molecular Physics | Thermodynamics

Two metal rods of same length and same cross-sectional area are coated with paraffin wax. But they are made of different materials. K_1 and K_2 are thermal conductivities of 1st and 2nd rod respectively. One end of each rod is introduced to a vapor compartment where the temperature is maintained at 100°C and the other end is kept at lower room temperature. After some time it is found that wax of 1st rod has melted over 50cm and wax of the 2nd one has melted over 25cm. Find a relation between K_1 and K_2 .

Solution:

Ingen Hausz provided a method to compare the thermal conductivities of different materials.

$$\frac{K_1}{K_2} = \frac{l_1^2}{l_2^2} = \frac{0.5^2}{0.25^2} = 4$$

Answer: $\frac{K_1}{K_2} = 4$.