Answer on Question #72766, Physics / Other

If the linear expansivity of a copper rod is 0.000017/k, calculate the expansivity of 10m of copper rod when heated from 10 degree celcius to 80 degree celcius.

Solution:

The linear expansivity of a substance is defined as an increase in length, per-unit length, per degree rise in temperature. In symbols this is equivalent to:

$$\alpha = \frac{L_2 - L_1}{L_1(T_2 - T_1)}$$

where, α = linear expansivity, L_1 = initial length, L_2 = final length, T_2 = final temperature, T_1 = initial temperature.

$$\Delta L = L_2 - L_1 = expansion$$
$$\Delta L = \alpha L_1(T_2 - T_1)$$

So,

$$\Delta L = 0.000017 \times 10 \times (80 - 10) = 0.0119 \text{ m}$$

Answer: 0.0119 m.