**QUESTION:**

a 2 meter lng unknown material at 27 degree celcius is heated until it is 2.0024 meter at 77 degree celcius. what is the coefficient of the linear expansion of the unknown material?

**SOLUTION:**

The coefficient of the linear expansion is

$$\alpha_L = \frac{1}{L} \cdot \frac{\Delta L}{\Delta T}$$

Where L=2 meter is a particular length measurement, $\Delta L = 2 - 2.0024 = 0.0024 \; m$ is the change in the length of the material, $\Delta T = (77 + 273.15) - (27 + 273.15) = 50 \; ^{o}C$ is the change in temperature. Hence

$$\alpha_L = \frac{1}{2} \cdot \frac{2.0024 - 2}{50}$$

$$\alpha_L = 0.000024 = 24 \cdot 10^{-6} \; (^{o}C)^{-1}$$

**ANSWER**

$$\alpha_L = 24 \cdot 10^{-6} \; (^{o}C)^{-1}$$