Answer on Question #73447-Physics-Other

A brass rod and aluminum are 90.00 cm and 90.06 cm respectively at 20°c. at what common temperature will the two rods be exactly the same length?

Solution

$$L'_2 = L'_1$$

$$L_2(1 + \alpha_2 \Delta T) = (1 + \alpha_1 \Delta T)L_1$$

$$(L_2 + L_2\alpha_2\Delta T) = (L_1 + L_1\alpha_1\Delta T)$$

$$\Delta T = \frac{l_2 - L_1}{L_1\alpha_1 - L_2\alpha_2}$$

$$T = 20 + \frac{0.9006 - 0.9}{0.9(1.9 \cdot 10^{-5}) - 0.9006(2.3 \cdot 10^{-5})} = -146°C.$$

Answer: -146°C.

Answer provided by https://www.AssignmentExpert.com