Answer on Question #37952 – Physics – Thermodynamics

Question:

A piece of lead [c = 128 J/(kg·C°)] is heated from 18.0 °C to 30.6 °C. The same amount of heat is added to a piece of copper [c = 387 J/(kg·C°)]. The mass and initial temperature of the copper are the same as for the lead. Determine the final temperature T_f of the copper.

Answer:

$$Q = cm\Delta T$$

where m is mass, ΔT – change of temperature, Q is amount of heat.

If amounts of heat are the same:

$$c_c \Delta T_c = c_l \Delta T_l$$

Therefore, change of temperature of copper equals:

$$\Delta T_c = \Delta T_l \frac{c_l}{c_c}$$

Therefore, final temperature of copper equals:

$$T_f = T_0 + \Delta T_l \frac{c_l}{c_c} = 18 + (30.6 - 18)\frac{128}{387} = 22.2\ ℃$$

Answer: 22.2 ℃