

Q. 02

A silver wire has a resistance of 2.1Ω at 27.5°C , and a resistance of 2.7Ω at 100°C . Determine the temperature coefficient of resistivity of silver.

Answer

Temperature, $T_1 = 27.5^\circ\text{C}$

Resistance of the silver wire at T_1 , $R_1 = 2.1 \Omega$

Temperature, $T_2 = 100^\circ\text{C}$

Resistance of the silver wire at T_2 , $R_2 = 2.7 \Omega$

Temperature coefficient of silver = α

It is related with temperature and resistance as

$$\begin{aligned}\alpha &= \frac{R_2 - R_1}{R_1(T_2 - T_1)} \\ &= \frac{2.7 - 2.1}{2.1(100 - 27.5)} = 0.0039^\circ\text{C}^{-1}\end{aligned}$$

Therefore, the temperature coefficient of silver is $0.0039^\circ\text{C}^{-1}$.