

Answer on Question #73372, Chemistry / General Chemistry :

Determine molar conductivity given length 2cm surface area 2.5cm² , 0.001mol/dm³ of KCl at 25°C.

Conductivity meter deeped into solution reads 0.005 S*cm⁻¹.

Solution.

$$l = 2\text{cm}$$

$$S = 2.5\text{cm}^2$$

$$C = 0.001\text{mol} / l$$

$$\kappa = 0.005\text{S} \cdot \text{cm}^{-1}$$

$$\Lambda - ?$$

Molar conductivity is defined as the conducting power of all the ions produced by dissolving one mole of an electrolyte in solution.

$$\Lambda = \frac{\kappa}{C}$$

And:

$$\Lambda = \frac{\kappa}{C} = \frac{0.005\text{S} \cdot \text{cm}^{-1}}{0.001\text{mol} / \text{dm}^3} = \frac{0.5\text{S} \cdot \text{m}^{-1}}{1\text{mol} / \text{m}^3}$$

$$\Lambda = 0.5\text{S} \cdot \text{m}^2 / \text{mol}$$

Answer: $\Lambda = 0.5\text{S} \cdot \text{m}^2 / \text{mol} .$