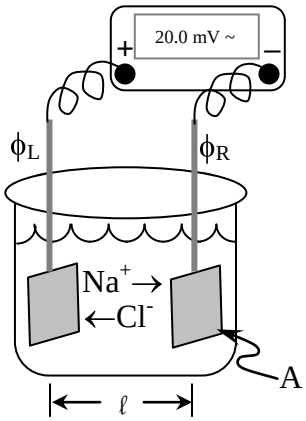
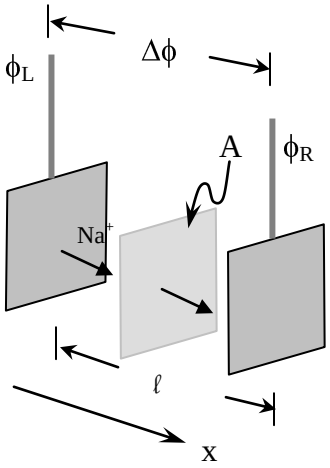
Conductivity:

Ohm's Law: $\Delta\phi = IR$





Conductance: $G = 1/R$

Conductivity: $\kappa = \frac{1}{R}\left(\frac{\ell}{A}\right) = \frac{G\,\ell}{A}$

cell constant = $\left(\frac{\ell}{A}\right)$

1 S = 1 ohm^{-1} = 1 mho

1 mS m^{-1} = 1x10^{-3} S m^{-1} 1 μS cm^{-1} = 1x10^{-6} S cm^{-1}

1 S m^{-1} = 1 S cm^{-1}(100 cm/1 m) 1 μS cm^{-1} = 1 mS m^{-1}(1 m/100 cm)(1000 μS/1 mS)

Molar conductivity: $\Lambda_m = \frac{\kappa}{c}$

$\kappa = \Lambda_m c$

$\Lambda_m = \Lambda_m^o - \mathcal{K} c^{1/2}$

$\kappa = (\Lambda_m^o - \mathcal{K} c^{1/2})\, c = \Lambda_m^o c - \mathcal{K} c^{3/2}$

$\Lambda_m^o = \nu_+\lambda_+ + \nu_-\lambda_-$

$M_{\nu+}X_{\nu-}$ example: Na_2NO_3 $\nu_+ = 2$ and $\nu_- = 1$

	λ_+		λ_- (mS m^2 mol^{-1})
Na^+	5.09	Cl^-	7.55
K^+	7.45	NO_3^-	7.06
H^+	35.0	OH^-	19.2
Ca^{2+}	12.0	SO_4^{2-}	15.8

0.100 M Na_2SO_4 $\Lambda_m^o = 2(5.09) + 1(15.8)$
$= 25.98$ mS m^2 mol^{-1}

0.001 M	0.01 M	0.1 M
24.83	22.488	17.996 mS m^2 mol^{-1}