Appendix

Error Analysis

The error in thickness of the disc, ℓ and the diameter of the electrode, d are treated using the least square method.

$$\text{Varian, } \sigma^2 = \frac{\sum_{i=1}^{n}(X_i - \overline{X})^2}{n}$$

$$\text{Standard Deviation, } S = \frac{\sigma}{\sqrt{n-1}}$$

where $\overline{X}$ = mean value

The error for area, A is

$$\Delta A = \left|\frac{2\Delta d}{d}\right| A$$

The uncertainty for the gradient of the graph of I versus V and log I versus log V was also determined using the least square method. The error for the conductivity is given by

$$\Delta\sigma = \sigma\left[\left(\frac{\Delta m}{m}\right)^2 + \left(\frac{\Delta\overline{\ell}}{\overline{\ell}}\right)^2 + \left(\frac{\Delta A}{A}\right)^2\right]^{\frac{1}{2}}$$