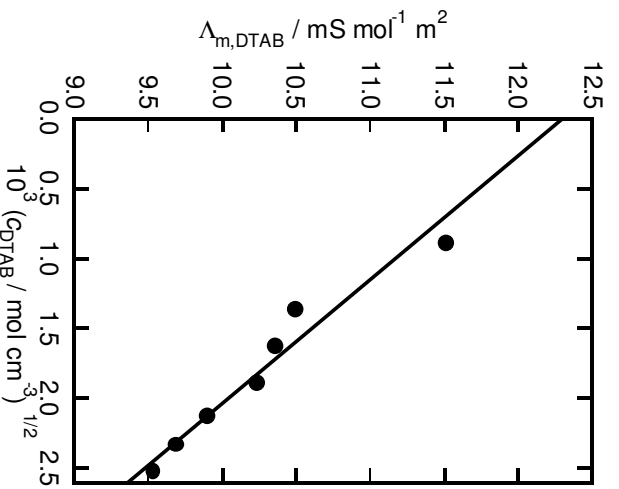


Dynamic Electrochemistry

SUMMARY

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Electrolyte Conductivity



Kohlrausch Law

$$\Lambda_m = \Lambda_m^\circ - Kc^{1/2}$$

eqn. 1.6

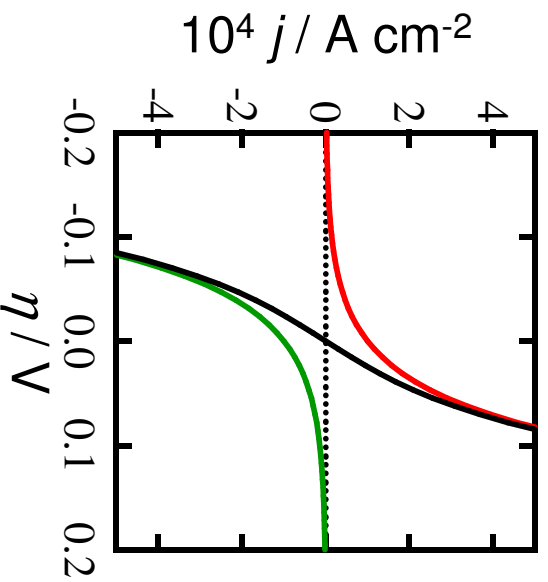
Law of independent migration

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

eqn. 1.8

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Electron Transfer Kinetics



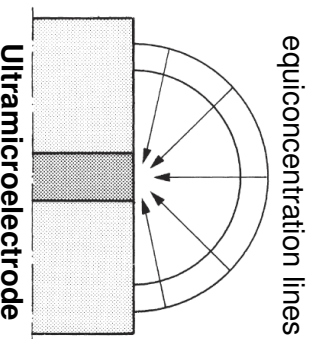
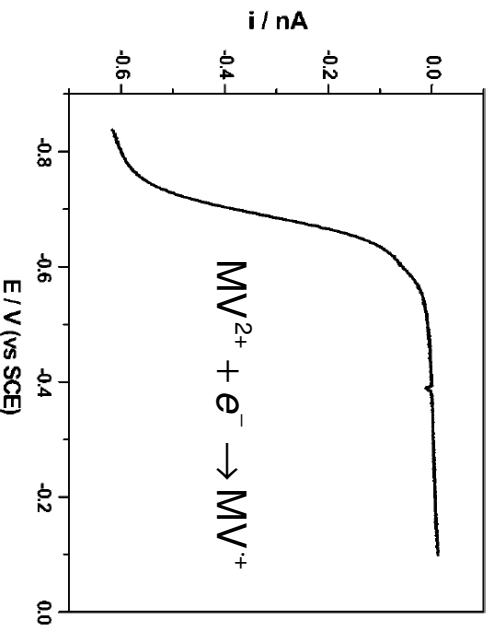
Butler-Volmer Equation

$$j(E) = j_0 \left[\exp \left(\alpha \frac{nF}{RT} \eta \right) - \exp \left(-(1-\alpha) \frac{nF}{RT} \eta \right) \right] \quad \text{eqn. 2.10}$$

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Diffusion Control

Fixed diffusion layer thickness



Ultramicroelectrode

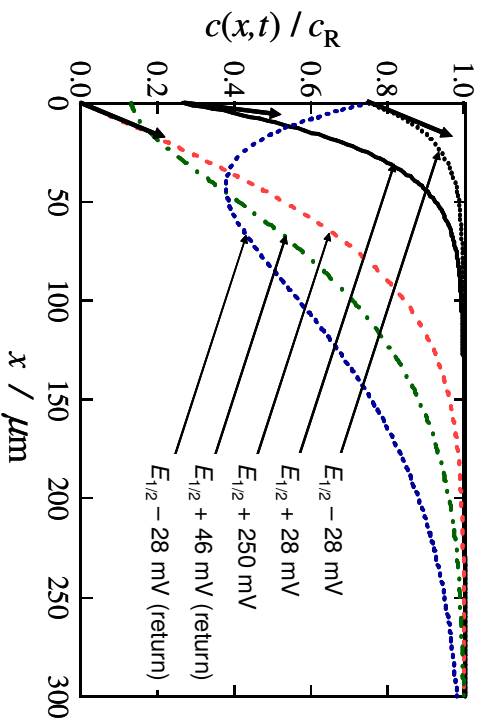
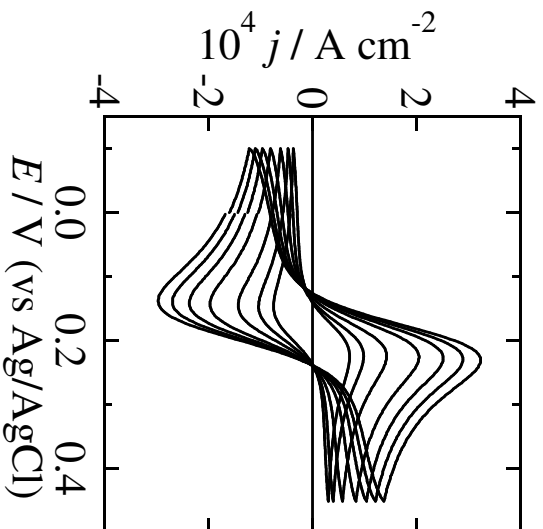
Microdisc anodic limiting current

$$i_{l,d} = 4nFD_R r_d C_R (\infty) \quad \text{eqn. 3.18}$$

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Diffusion Control

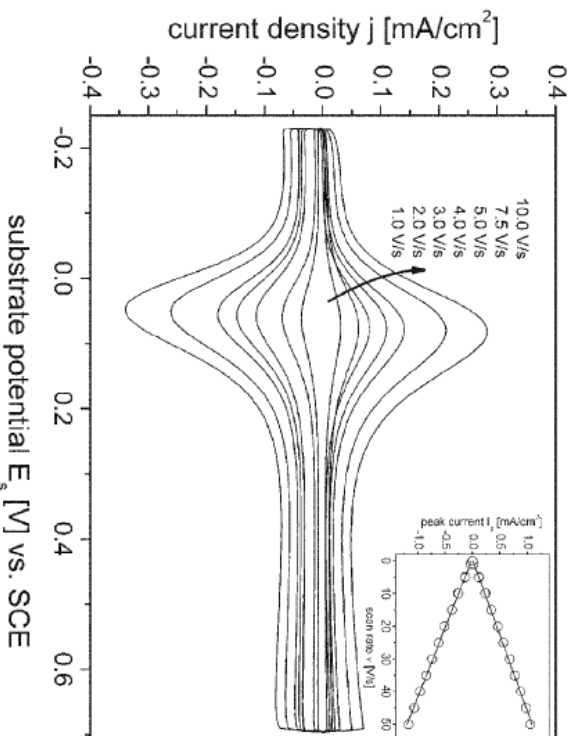
Semi-infinite linear diffusion



Randles-Sevcik equation

$$i_{a,\text{peak}} = 2.69 \times 10^5 n^{3/2} A D_R^{1/2} c_R \nu^{1/2} \quad \text{eqn. 4.19} \quad 114$$

Surface Confined Species



$$i_{\text{peak}} = \frac{n^2 F^2}{4RT} \nu A \Gamma^* \quad \text{eqn. 5.11}$$