



Correction to: Comments on the shape of voltammetric plots of reversible stoichiometric reactions for linear potential scan

M. A. Vorotyntsev¹ · P. A. Zader¹ · D. V. Konev^{1,2}

Published online: 27 November 2021

© Springer-Verlag GmbH Germany, part of Springer Nature 2021

Correction to: Journal of Solid State Electrochemistry
<https://doi.org/10.1007/s10008-021-05073-y>

The original article contained a mistake. Below the list of corrected formulas with original numeration is given:

$$O^0(t)/R^0(t) = Z(t) \text{ for } x = 0 \text{ where } Z(t) = \exp \left[nF(E(t) - E^{0'}) / RT \right] \quad (2)$$

$$D_R \partial R / \partial x = -D_O \partial O / \partial x = i / nF \text{ for } x = 0 \quad (4)$$

$$\partial R / \partial t = D_R \partial^2 R / \partial x^2, \quad \partial O / \partial t = D_O \partial^2 O / \partial x^2 \text{ for } 0 < x < \infty \quad (6)$$

$$R'(x, t) = R^* - R(x, t), \quad \partial R' / \partial t = D_R \partial^2 R' / \partial x^2, \\ R' \rightarrow 0 \text{ for } t \rightarrow -\infty \text{ and for } x \rightarrow \infty, \\ R' = R'(0, t) = Z_{1/2}(t) [1 + Z_{1/2}(t)]^{-1} R^* \text{ for } x = 0 \quad (11)$$

$$y = (nF/RT)(E - E_{1/2}) = (nFv/RT)(t - t_{1/2}) \\ \text{so that } Z_{1/2} = \exp(y), \quad R'(0, t) = R^* [1 + \exp(y)]^{-1} \quad (15)$$

$$i(t) = [(nF)^3 v / RT]^{1/2} R^* (D_R / \pi)^{1/2} I(y, -\infty) \\ \text{where } I(y, -\infty) \equiv \int_{-\infty}^y (y - y')^{-1/2} \exp(y') [1 + \exp(y')]^{-2} dy' \quad (16)$$

$$R(x, t) = R^*, \quad R'(x, t) \equiv R^* - R(x, t) = 0, \quad O(x, t) = 0 \\ \text{for } t \leq t_i, \quad 0 < x < \infty \text{ and for } t < t_i, \quad x = 0 \quad (17)$$

$$R^0(t_i + 0) \equiv R(0, t_i + 0) = [1 + Z_{1/2}(t_i)]^{-1} R^*, \\ R'(0, t_i + 0) \equiv R^* - R^0(t_i + 0) = Z_{1/2}(t_i) [1 + Z_{1/2}(t_i)]^{-1} R^*, \\ O_i^0 \equiv O^0(t_i) = Z(t_i) R_i^0 \text{ for } t = t_i + 0 \quad (18)$$

$$i(t) = nF(D_R / \pi)^{1/2} \int_{t_i - 0}^t (t - t')^{-1/2} \frac{dR'(0, t')}{dt'} dt' \quad (19)$$

$$i(t) = nF(D_R / \pi)^{1/2} \left[(t - t_i)^{-1/2} R'(0, t_i + 0) + \int_{t_i + 0}^t (t - t')^{-1/2} \frac{dR'(0, t')}{dt'} dt' \right] \quad (20)$$

$$i(t) = [(nF)^3 v / RT]^{1/2} R^* (D_R / \pi)^{1/2} I_{OCP}(y, y_i), \\ I_{OCP}(y, y_i) \equiv (y - y_i)^{-1/2} [1 + \exp(-y_i)]^{-1} + I(y, y_i), \\ \text{where } I(y, y_i) \equiv \int_{y_i}^y (y - y')^{-1/2} \exp(y') [1 + \exp(y')]^{-2} dy' \quad (21)$$

The original article can be found online at <https://doi.org/10.1007/s10008-021-05073-y>.

✉ M. A. Vorotyntsev
 mivo2010@yandex.com

¹ Frumkin Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow, Russia

² Institute of Problems of Chemical Physics, Russian Academy of Sciences, Chernogolovka, Russia

$$R^{**} = [1 + Z_{1/2}(t_i)(D_O/D_R)^\chi]^{-1} R^*,$$

$$O^{**}/R^{**} = Z(t_i) = \exp \left[nF(E_i - E^{0'})/RT \right]$$

where $\chi = 1/2 - \lambda > 0$

(25)

$$R^0(t) = [1 + Z_{1/2}(t_i)] [1 + Z_{1/2}(t)]^{-1} \cdot R^{**} =$$

$$= [1 + Z_{1/2}(t_i)] \cdot [1 + Z_{1/2}(t) \cdot (D_O/D_R)^\chi]^{-1} R^* [1 + Z_{1/2}(t)]^{-1}$$

(27)

$$i(t) = nF(D_R/\pi)^{1/2} \int_{t_i-0}^t (t-t')^{-1/2} \frac{dR'(0,t')}{dt'} dt'$$

(28)

$$i(t) = [(nF)^3 v/RT]^{1/2} R^* (D_R/\pi)^{1/2} I_E(y, y_i)$$

where $I_E(y, y_i) = [1 + \exp(y)] [1 + \exp(y)(D_O/D_R)^\chi]^{-1} I(y, y_i)$,

(29)

$$I(y, -\infty) \cong I_{appr}(y, -\infty) \equiv \pi^{1/2} \exp(y) [1 - 2^{1/2} \exp(y) + \dots]$$

for $y < 0$, $|y| \gg 1$

(30)

$$I(y, -\infty) \cong I_{appr}(y, -\infty) \equiv y^{-1/2} (1 + \pi^2/8y^2)$$

for $y \gg 1$

(31)

$$\Delta I_{OCP}(y, y_i) \equiv I(y, -\infty) - I_{OCP}(y, y_i) =$$

$$= -(y - y_i)^{-1/2} [1 + \exp(-y_i)]^{-1} + \Delta I(y, y_i)$$

where $\Delta I(y, y_i) \equiv I(y, -\infty) - I(y, y_i) =$

$$= \int_{-\infty}^{y_i} (y - y')^{-1/2} \exp(y') [1 + \exp(y')]^{-2} dy'$$

(32)

$$\Delta I_{OCP}(y, y_i) \cong \Delta I_{OCP(appr)}(y, y_i) \equiv$$

$$\equiv -\exp(y_i) \left[\frac{1}{2}(y - y_i)^{-3/2} - \left(\frac{3}{4} \right) (y - y_i)^{-5/2} + \dots \right]$$

for $y_i < 0$, $|y_i| \gg 1$, $y - y_i \gg 1$

(33)

$$\Delta I(y, y_i) \equiv I(y, -\infty) - I(y, y_i) =$$

$$= \int_{-\infty}^{y_i} (y - y')^{-1/2} \exp(y') [1 + \exp(y')]^{-2} dy'$$

(34)

$$\Delta I(y, y_i) \cong \Delta I_{appr}(y, y_i) \equiv$$

$$\equiv \exp(y_i) \left[(y - y_i)^{-1/2} - \frac{1}{2}(y - y_i)^{-3/2} + \left(\frac{3}{4} \right) (y - y_i)^{-5/2} + \dots \right]$$

for $y_i < 0$, $|y_i| \gg 1$, $y - y_i \gg 1$

(35)

The original article has been corrected.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.