

electrode current density, j

If the charging current is negligible, in the case of a single electrode reaction, the electrode current density (c.d.) of the electric current flowing through the electrode is related to the flux density of a species **B** by the equation:

$$j = n \nu_{\mathbf{B}}^{-1} F (N_{\mathbf{B}})_e$$

where $(N_{\mathbf{B}})_e$ is the normal component of the vector $N_{\mathbf{B}}$ at the electrode-solution interface, n is the charge number of the electrode reaction and $\nu_{\mathbf{B}}$ is the stoichiometric number of species **B**. The ratio $\frac{n}{\nu_{\mathbf{B}}}$ is to be taken as positive if the species **B** is consumed in a cathodic reaction or produced in an anodic reaction. Otherwise it is to be taken as negative. With the convention that the normal distance vector points into the electrolytic solution, a cathodic current is then negative, an anodic current positive.

Source:

PAC, 1981, 53, 1827 (*Nomenclature for transport phenomena in electrolytic systems*) on page 1835