

Transient current for change in bulk concentration on rotating disc electrode for E' reaction (quasi-reversible): Theoretical simulation and experimental validation

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Most of the theoretical simulation works considered the electro-generated species concentration in the bulk taken as constant. In many paired electrolysis process, concentration of the active species concentration is changed with electrolysis time that is used for many applications. In this work, the transient current and concentration change in the rotating disc electrode (RDE) system is explained by solving the convection and diffusion equation for a quasi-reversible electron transfer. The mathematical models are solved by applying orthogonal collocation method. This approach enables us the current response and concentration change with electrolysis time. Experimental results compared with the theoretically simulated data. A good correlation found between the current and the RDE system. The possible expression derived in the present work for bulk concentration change can be used for dynamic electrolysis system.

Key words: E' reaction (quasi-reversible), Theoretical simulation, bulk concentration change