

BASIC ANALYSIS OF SQUARE-WAVE VOLTAMMOGRAMS

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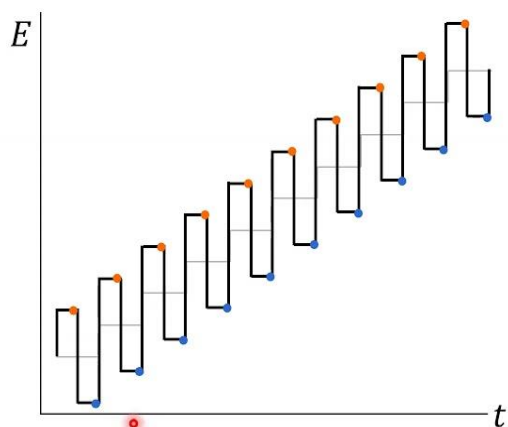
Square-wave voltammetry is a differential technique that utilizes a waveform consisting of a sequence of symmetrical square waves superimposed on a base staircase, which is applied to the working electrode. In an experiment using square-wave voltammetry, the potential of the working electrode is incrementally changed through a series of forward and reverse pulses, starting from an initial potential and ending at a final potential. The magnitude of the forward step is determined by the square amplitude, while the reverse step is determined by subtracting the square increment from the square amplitude.

When a square wave potential is applied to the working electrode, it generates electric currents. These currents are measured twice during each square-wave cycle: once at the end of the forward pulse (i_f) and once at the end of the reverse pulse (i_r). The difference between these two measured currents ($\Delta i = i_f - i_r$) is plotted against the potential of the base staircase. This process yields a symmetrical voltammogram with peak-shaped features, centered around the half-wave potential. The peak current observed is proportional to the concentration being analyzed.

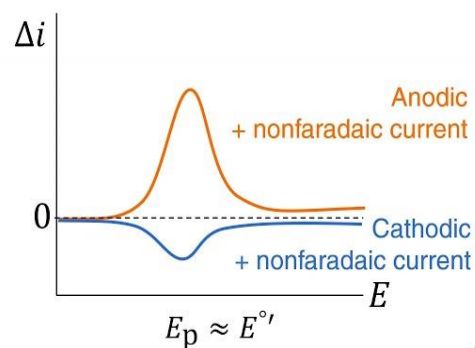
In this brief tutorial, we will discuss the fundamental principles behind analyzing square-wave voltammograms.

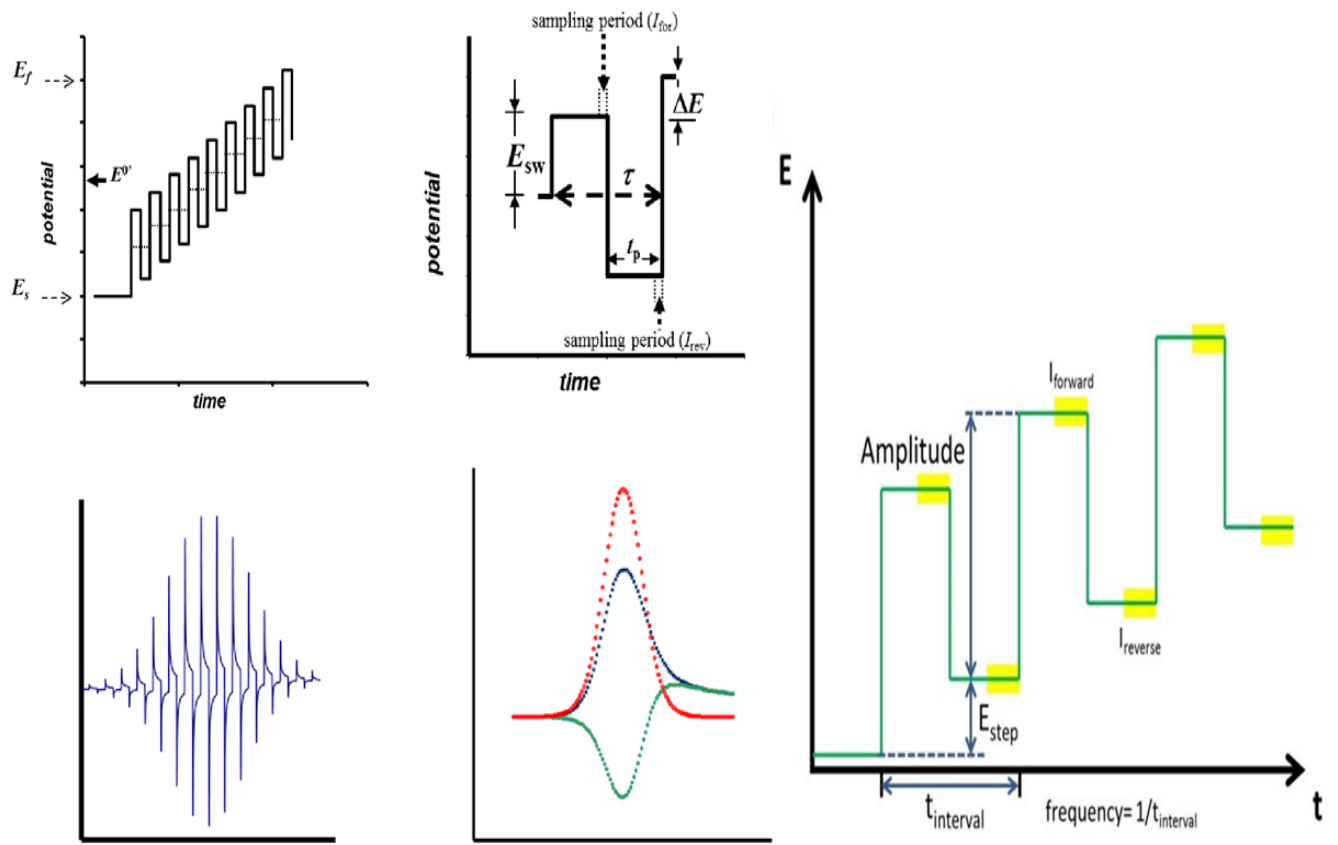
SWV utilizes current difference to eliminate nonfaradaic current and enhance faradaic current, improving sensitivity

SWV Waveform

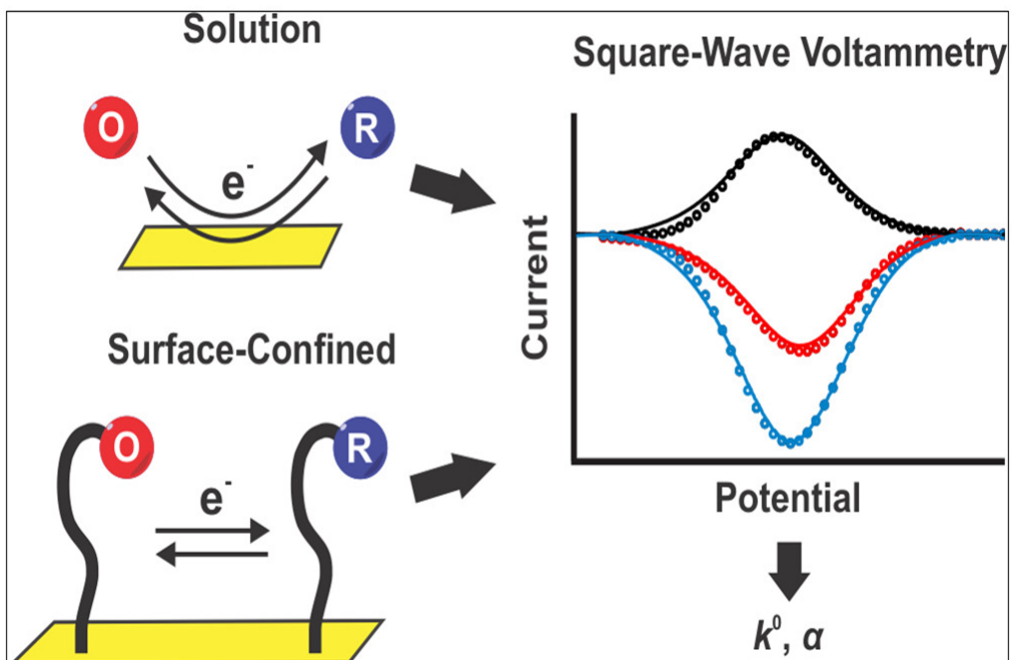
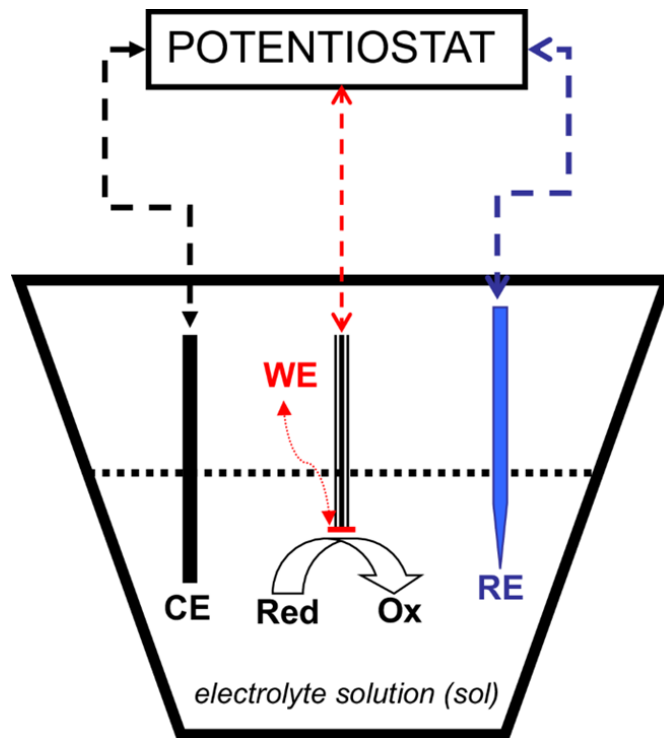


SWV voltammogram





Yellow spots are time-segments in which current is sampled in SWV



SWV Parameters

Parameters for Square Wave Voltammetry

(no instrument selected) [Audit](#) [Perform](#) [Create copy](#) [AutoFill](#)

Basic **Advanced** Ranges Filters Post Experiment Conditions

Induction period

Auto

Potential: 0 mV

Duration: 3 s

Relaxation period

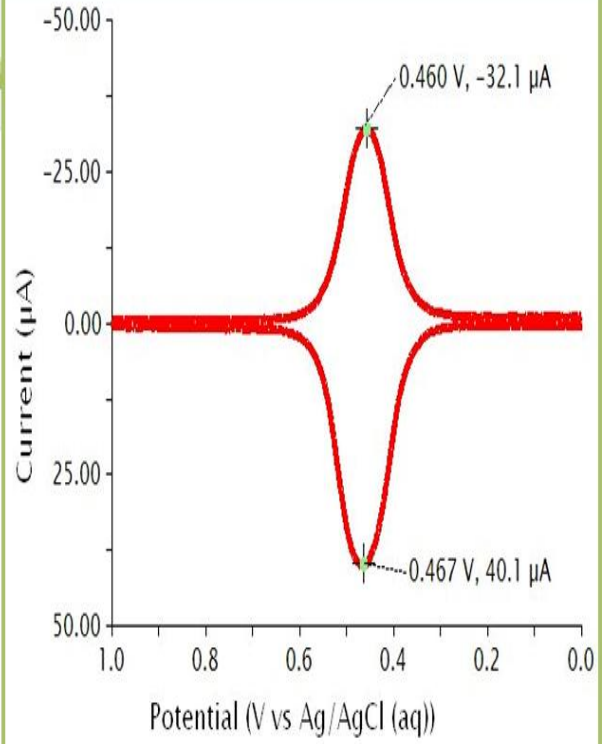
Auto

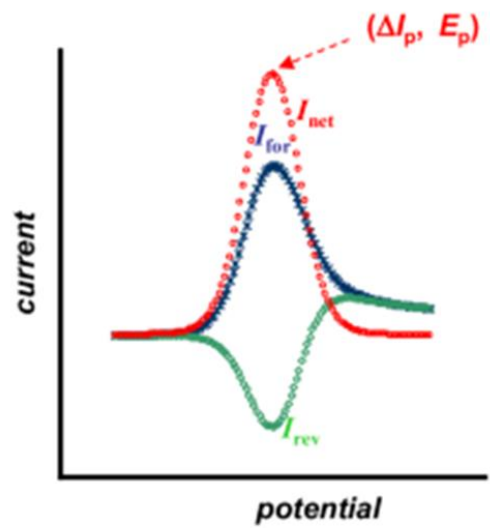
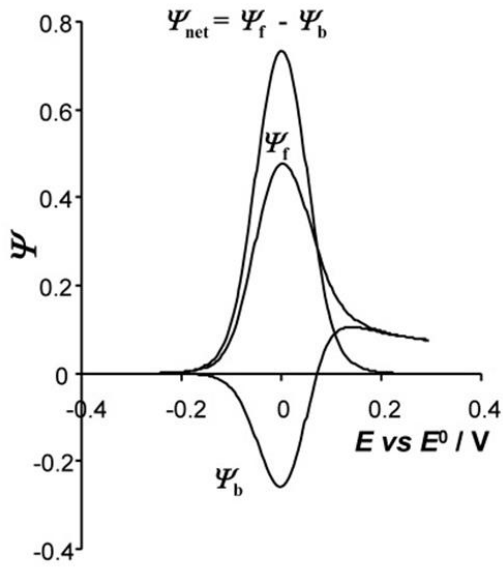
Potential: 0 mV

Duration: 1 s

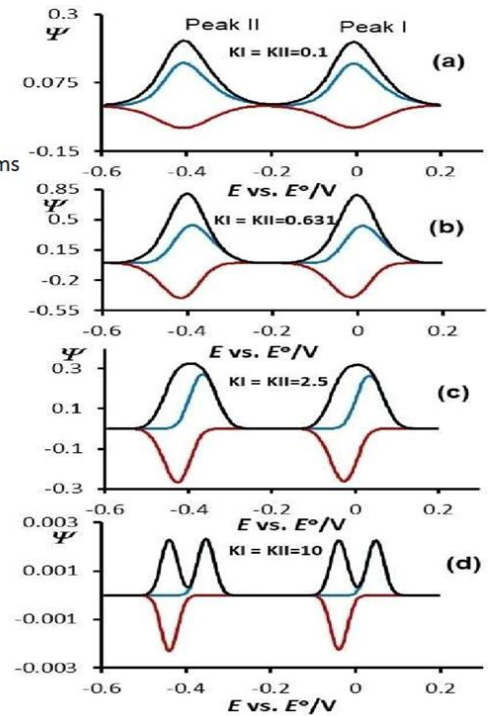
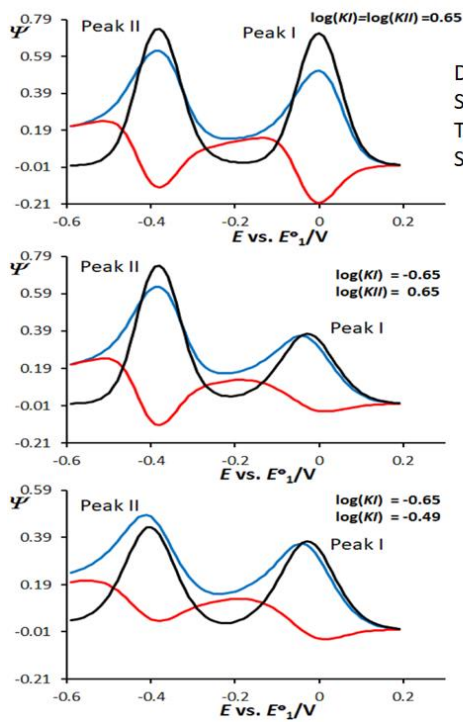
IR Compensation

Compensation Mode: Off





Measurable parameters of a square-wave voltammogram



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