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New Cyclic Voltammetry Method for Examining Phase Transitions on Electrodes: Simulated Results[1] IBRAHIM ABOU HAMAD, Mississippi State University, Starkville, MS 39762, DANIEL ROBB, PER ARNE RIKVOLD, Florida State University, Tallahassee, FL 32310 — We propose a new experimental technique for cyclic voltammetry, based on the first-order reversal curve (FORC) method for analysis of systems undergoing hysteresis. The advantages of this technique are demonstrated by applying it to dynamical models of electrochemical adsorption. The method can not only differentiate between discontinuous and continuous phase transitions, but can also quite accurately recover equilibrium behavior from dynamic analysis of systems with a continuous phase transition. The FORC diagram for a discontinuous phase transition is characterized by a negative (unstable) region separating two positive (stable) regions, while such a negative region does not exist for continuous phase transitions. Experimental data for Electrochemical FORC (EC-FORC) analysis could easily be obtained by simple reprogramming of a potentiostat designed for conventional cyclic-voltammetry experiments.

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