

Simple Instabilities in the Potentiostatic Oxidation of High Conducting Formic Acid/Formate Solutions

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Abstract

Measurements are presented that reveal instabilities in cyclic voltammograms for the oxidation of formic acid/formate occur in the limit in which the applied potential is equal to the potential between the reference and working electrodes. The instabilities are transitions between different cyclic voltammograms and they have mechanisms independent of uncompensated resistance. One instability takes place when the lower potential limit of the voltammogram is increased to the vicinity of a steep rise in current on the reverse scan. The ohmic drop is small in the region of these instabilities and it is shown to progress towards the ideal limit of a zero value. Results from varying the temperature, rotation rate, and concentration indicate that quantitative changes in the instabilities are directly related to parameter changes and that no relation exists with the uncompensated resistance.