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Analysis of the influence of different non-idealities and complex reaction schemes on the charge transfer processes of surface confined redox species

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Modification of conducting surfaces by means of the immobilization of electroactive species allows designing new functional interfaces for their application to a great number of practical applications. The electrochemical characterization of these systems gives rise very frequently to non-ideal responses in the sense that they show different features which are not predicted by simple, ideal models. Among the causes of non-idealities are the presence of intermolecular interactions, the presence of a molecular heterogeneity at the surface which causes the appearance of thermodynamic or kinetic dispersion, and also the possibility of complex reaction schemes [1, 2].

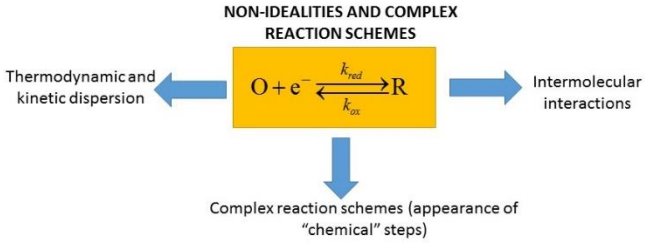

Figure 1. Scheme of the main purpose of the present research

Aiming for the comprehensive analysis of surface electrochemical processes, the goal of this project is to obtain rigorous solutions for the current-potential and charge potential responses in order to analyze and evaluate the influence of the different non-idealities of the reaction scheme. Although currently Cyclic Voltammetry (CV) is the most used electrochemical technique for the analysis of these type of processes, we will focus our studies in multipotential pulse techniques such as Staircase Voltammetry and Square Wave Voltammetry, together with their voltcoulometric modalities, since they allow performing a more direct kinetic analysis of the response than CV. Experimental verification of the proposed method will be done with different electroactive species.

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