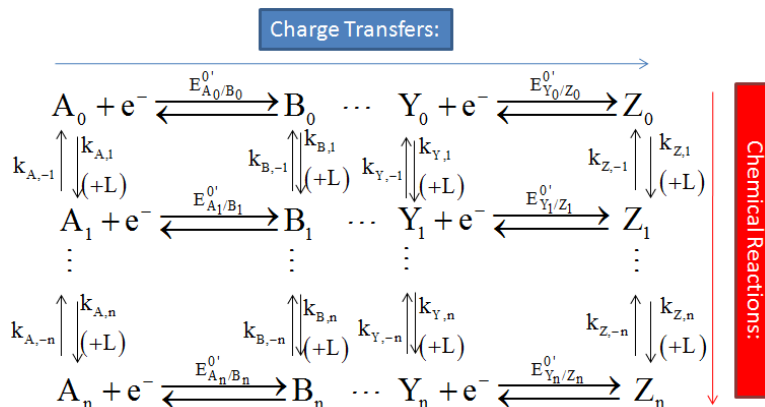


Study of multiple charge transfers coupled to chemical reactions at micro- and nanointerfaces with advanced electrochemical techniques.

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When any of the electroactive species involves in the charge transfer studied also takes part in a chemical process, the voltammetric response is influenced by the kinetics and the thermodynamics of such reaction, allowing its full characterisation [1]. Within this thesis research, the above kind of systems are studied at macro-, micro- and nanointerfaces of any geometry by employing several voltammetric techniques (see Scheme I) [2].



Scheme I. Reaction Scheme with the possible mechanisms to be studied.

Aiming for the comprehensive analysis of electrochemical reactions complicated by the chemistry of the redox species in solution, the goal of this project is to obtain rigorous analytical solutions for the determination of the main experimental variables and their influence on the voltammetric responses. Due to their experimental advantages, mostly cyclic voltammetry (CV) and square wave voltammetry (SWV) with microinterfaces are employed to perform the experimental verification of the theoretical solutions, and to establish adequate methodologies for the determination of kinetic, thermodynamic and mass transport parameters. As an example, ion pairing effects on the electro-reduction of the Keggin polyoxowolframate $\text{Na}_3(\text{PW}_{12}\text{O}_{40})$ with different cations in acetonitrile has been studied by using SWV at macro- and microelectrodes.

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