Electroactive Inherently Chiral Surfaces at Work: Clues toward the Elucidation of the Enantioselection Mechanism

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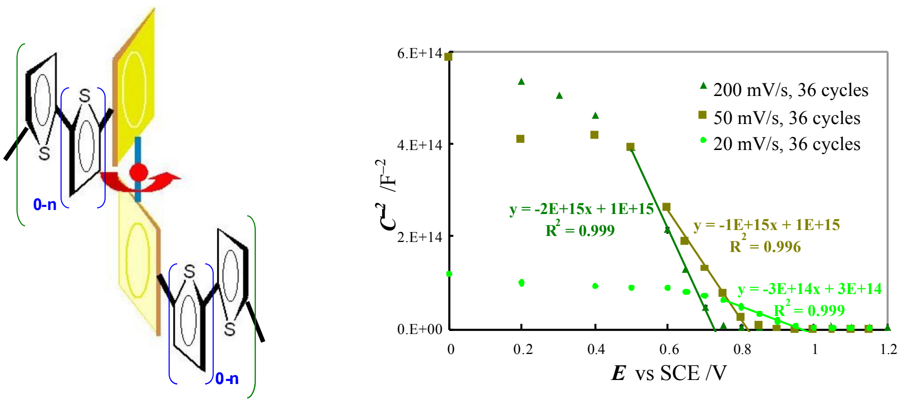
Chirality is a concept strictly related to life and to its evolution. Capability to discriminate antipodes and/or produce enantiopure chiral chemicals through cheap and efficient protocols is a crucial task for our modern civilization. So identification of increasingly effective and robust chiral selectors is a challenging task also for the electrochemical community [1,2].
In this frame our research group is working on the so called "inherently chiral functional molecular materials", ICFMMs; the idea is simple: make the stereogenic element responsible for chirality coincident with the functional group responsible for the material specific property (Figure, left). This approach has constituted an actual breakthrough in chiral electrochemistry, resulting in the preparation of efficient chiral electroactive surfaces [3,4,5] (and chiral additives/media, too [6]) invariably characterized by outstanding enantiodiscrimination ability in quite different working conditions and with chemically different chiral electroactive analytes. Notwithstanding plenty of proofs pointing to a general validity of the ICFMMs concept, a clear rationalization of the enantiodiscrimination mechanism still lacks.
To fill the gap a deeper knowledge of the behavior of our electrodeposited chiral films is mandatory. As a first step some of the most important experimental parameters governing the growth of the conductive coatings have been changed, one by one, to evaluate their impact on the morphological, optical and electronic properties of the final deposit. Results of the multi-technique characterization will be discussed, including profilometry, electrochemical impedance spectroscopy (Figure, right) and spectroelectrochemistry data, all aimed to collect clues useful to rationalize the way in which ICFMMs work.



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