

Nanostructured [M(*salen*)]-based thin films prepared by electropolymerization and layer-by-layer self-assembly

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Functionalized materials are of key interest with respect to both applications (e.g. in catalysis, electronic or optical devices, or sensors) and basic research, like in material and life sciences ('smart materials', molecular recognition, etc.). To be accessible, functional units are usually deposited at interfaces as films and many techniques have been exploited to fulfil this purpose [1,2]. [M(*salen*)] complexes are versatile building blocks that can easily be functionalised, allowing the preparation of quite different materials with tailored properties. In this work, we report the characterisation of thin films based in [M(*salen*)] complexes, M=Ni and Cu, prepared by two different methodologies: electropolymerisation and layer-by-layer technique (LbL).

Electropolymerisation allows the preparation of films with controlled thickness using redox functional units. [M(*salen*)] complexes, M=Ni and Cu, are redox active and can be polymerised by cyclic voltammetry in acetonitrile using Pt electrode. The resulting electroactive polymeric films were characterised by electrochemical techniques and in-situ UV-Vis spectroscopy. They behave as conducting polymers, showing significant different properties when compared with the parent redox monomers. [3,4]

Layer-by-layer (LBL) self-assembly permit the fabrication of versatile nanoassemblies with precise control of the composition, number of layers and thickness at nanometer level [5,6]. [M(*salen*)] complexes functionalised with ionic substituents in the aldehyde fragment were deposited on a charged surface, alternatively with the traditional organic polyelectrolytes: PAH (poly allylamine hydrochloride) and PSS (poly styrenesulfonate). The building up of the multilayers was monitored by UV-Vis spectroscopy and EQCM. Surface characterization of both type of films was performed by SEM and AFM.

References:

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