

SPECTROSCOPIC CHARACTERIZATION OF NEW METALLOPORPHYRIN-BASED MOLECULARLY IMPRINTED POLYMERS

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Molecular imprinting is an attractive approach for designing selective materials because it allows the formation of specific recognition (and possibly catalytic) sites in polymer matrices using molecular template. Extensive efforts have been made to develop molecularly imprinted polymers (MIPs) by employing both covalent and non-covalent interactions. Among these approaches, metal ion mediated recognition have received great attention becoming a viable way to develop MIPs with novel and enhanced recognition characteristics [1]. Key to their success is in advantages associated with metal-coordination interaction [2]: its formation and breakage take place in aqueous environment without requiring severe conditions; moreover, great versatility is offered by the ability of metal ions to interact with different functional groups. Also the availability of a vast array of ligands allows to define the coordinating properties of the metal centres towards different analytes. All these advantages have promoted the application of metal-coordination based MIPs in different fields from sensors [3] and catalysts [4] to sorbents for chemo- and enantioselective separation [5].

As far as we know, these MIP receptors have been developed by chemical synthesis. We have recently proposed [7], for the first time, electropolymerization as an attractive tool for designing MIPs based on metal-coordination interaction. This choice aims to combine in MIP technology advantages associated to metal coordination to ones coming from electropolymerization. In this way, the imprinted polymer film can be easily grown such that it adheres to conducting electrodes of any shape and size and with a thickness that can be controlled via the deposition conditions [6].

A Co-porphyrin (Co(III)tetrakis *orto*-aminophenyl porphyrin (CoTAPP)) has been used as monomer. After preliminary UV-Vis complexation study [7], a toxic organohalide (4-(2,4-dichlorophenoxy) butyric acid (2,4-DB)) has been selected as template and occurrence of imprinting has been verified electrochemically [7]. In the present work spectroscopic characterizations of MIP and not imprinted (NIP) films, aimed to enlighten polymer structures and imprinting process, are reported. Comparison of monomer and polymer UV-Vis spectra suggests that the structure of the complex unit remains intact upon electropolymerization thus being available for subsequent rebinding of the analyte by MIP. Also, XPS and FTIR analysis of MIP and NIP will be described to further verify the imprinting effect.

References

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