

## ELECTROINITIATED COPOLYMERIZATION OF VINYLIC MOLECULES ON GOLD SUBSTRATES

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The aim of this work is to obtain new modified substrates with various surface properties by simultaneous electropolymerization of two vinylic monomers (methacrylonitrile (MAN) and methyl methacrylate (MMA)). The mechanism of the electro-initiated grafting of vinylic homopolymers on metallic electrodes is now well documented [1-5]. It was shown that electrografting occurs (i) when the suited molecule is electroreducible inside the field of electroactivity of the basic salt, (ii) when the solvent used for the synthesis is at least one swelling of the growing polymer and (iii) when the diffusion of the monomers towards the surface of the electrode is at least of the same order of magnitude as the rate of the propagation reaction. But what happens when two monomers are simultaneously present in the solution? Is it necessary to take also into account new molecular parameters like (i) the respective reduction potentials of the two monomers, (ii) the relative nucleophilicity of the anions propagating the reaction, (iii) the proticity and the molecular structure of the neutral molecules? In this work, we discuss the influence of all these parameters thanks to cyclic voltammetry, chrono-amperometry and computational calculations of quantum chemistry results. After electrochemical synthesis, the electrodes are analyzed by infra-red spectroscopy in reflection-absorption mode (IRRAS) and X-Ray Photoelectron Spectroscopy (XPS) in order to determine the relative proportions of both monomers implied in the construction of organic film.

[1] see, for example, C. Bureau and J. Delhalle, *J. Surf. Anal.*, 6, 159 (1999) and references herein.

[2] J. Charlier, C. Bureau and G. Lcayon, *J. Electroanal. Chem.*, 465, 200 (1999)

[3] P. Viel, C. Bureau, G. Deniau, G. Zalczer and G. Lcayon ; *J. Electroanal. Chem.*, 470, 14 (1999)

[4] C. Bureau, *J. Electroanal. Chem.* 479, 43 (1999).

[5] G. Deniau, P. Viel, C. Bureau, G. Zalczer, P. Lixon and S. Palacin, *J. Electroanal. Chem.* 505, 33 (2001).