Spontaneous incorporation of silver particles in thiophene-based conducting polymers

Silver dispersions on polymer matrices are among the most studied hybrid systems involving electronically conducting polymers. The metal clusters formation may be carried out by electrodeposition [1], electroless deposition [2] or, in the special case of polyaniline or polypyrrole, by electroless precipitation [3]. It is well known the capacity that those N-containing polymers have to spontaneously reduce noble metal ions in solution during its dynamic maintenance of the equilibrium [4,5]. Nevertheless, little is known about the mechanisms involved in metal spontaneous reduction by conducting polymers from other families.

In this work we carried out a systematic study of the silver "electroless" reduction by conducting polymers from the family of thiophene. Polymeric films of PEDOTh, P3MeTh and PTh were electrosynthesized on platinum substrates and immersed, in the reduced or oxidized state, in silver containing solutions under open circuit conditions. The electrode potential was monitored during this process as well as the electrode mass variations by microgravimetry. The modified electrodes were characterized by cyclic voltammetry (before and after exposure to silver solutions) and by hi-resolution microscopy (SEM and AFM).

In this talk, some aspects of my life before and after my master's studies will also be covered, highlighting how I became interested electrochemistry, instrumentation and water splitting.

References:

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