

Anodic Generation of Ionophoric Conductive and Redox Polymers

Jacques Simonet

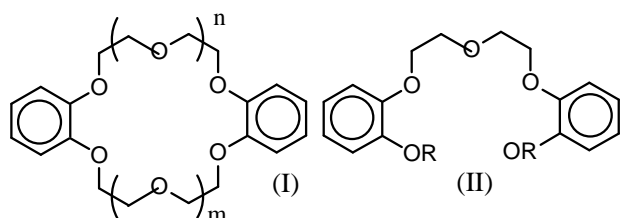
Laboratoire d'Electrochimie Moléculaire et Macromoléculaire, UMR 6510, Campus de Beaulieu, Université de Rennes 1, 35042 Rennes Cedex, France

The importance of ionophoric materials is constantly growing due to their capacity (often selective) to trap pollutant cations like heavy metals ions or radioactive cations. The interest is increased tenfold when the ease of formation and the electrochemical and chemical stability of these resins are largely improved. Such families of polymers can be electrochemically synthesized according two modes of well distinct procedures : (i) the complexing cage is already present in the monomer molecule and is not affected by the anodic polymerization process; (ii) the complexing site does not belong to the starting substrate and can be tailored in the course of the polymerization process.

Several types of ionophoric materials were built anodically by our group [1-4] in the course of the past years using methods (i) and (ii).

(A) Anodic trimerization of dibenzo-crown ethers

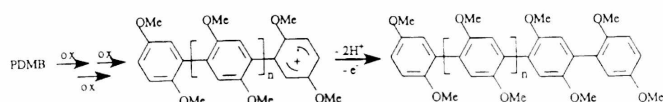
Aromatic orthodiethers (like veratrole) are well known to exhibit either chemically or electrochemically the formation of the corresponding hexaalkoxytriphenylenes (T). In these conditions, the anodic polymerization of (I) leads polytriphenylenes T_n possessing a large ratio of crownethers moieties.



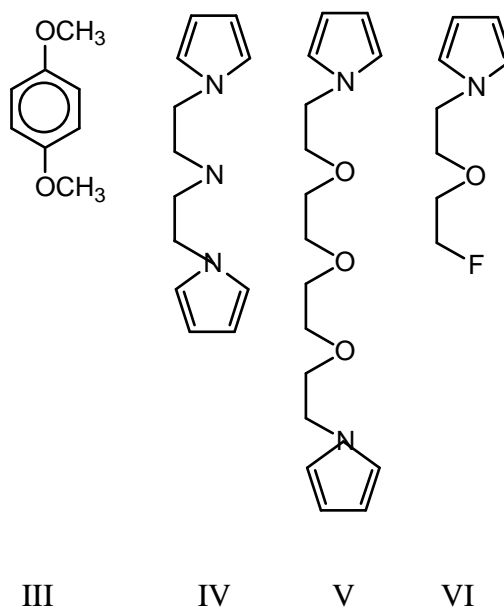
Similarly, resins from (II) -substrates much easier to synthesize- could be tested and also showed interesting properties.

(B) Electrochemical polymerization of paradialkoxy-benzenes and related compounds

In carefully dry conditions, paradimethoxy-benzene (III) did not afford paraquinone but quite well organized poly paraphenylenes (PPP).



Other substrates like pyrroles substituted by a long chain (with O and / or as N heteroatoms) can give more complex polymerization processes when amounts of electricity of $4 F \text{ mole}^{-1}$ are reached (example: formation of two polymeric chains with IV and V). Other pyrroles (like VI) may possess specific electron rich functional groups F not affected by the oxidation process.



Data on the specific extraction of cations with some of these resins will be given.

References

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3. J. Simonet, Y. Gache, N. Simonet-Gueguen and O. Leclerc, *Denki Kagaku.*, **62** (1994) 1211.
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