Società Chimica Italiana
Gruppo Interdivisionale Sensori

UNIVERSITÀ DEGLI STUDI DI PARMA

Società Italiana di Ottica e Fotonica

GS 2015

in memoria di Marco Mascini

Sensori e biosensori: stato dell'arte e nuove prospettive

BOOK OF ABSTRACTS

Parma, 15-17 giugno 2015

O - 17

ENANTIORECOGNITION TOWARDS L- AND D-DOPA ON EASY-TO-PREPARE INHERENTLY CHIRAL FILM ELECTRODES

Serena Arnaboldi[1], Patrizia R. Mussini[1], Francesco Sannicolò[1], Tiziana Benincori[2], Andrea Penoni[2]

[1]*Dip. di Chimica, Univ. degli Studi di Milano, Via Golgi 19, 20133 Milano, Italy*
[2]*Dip. di Scienza e Alta Tecnologia, Univ. degli Studi dell'Insubria, via Valleggio 11, 22100 Como, Italy*
serena.arnaboldi@unimi.it

We have recently shown[1,2] that oligomers endowed with "inherent chirality" display high chirality manifestations plus a pool of unprecedented properties. In particular, in the very last months we have demonstrated that electrooligomerization (especially in ionic liquids) of our inherently chiral monomers on screen-printed electrodes and on glassy carbon tip electrodes affords inherently chiral electroactive films of outstanding enantiodiscrimination ability towards a series of chiral probes of quite different bulkiness and chemical nature (also of pharmaceutical interest like DOPA, common antibiotics and FANS)[3]. The general validity of the "inherent chirality" concept has been confirmed by characterizing monomers and related films based on different atropisomeric biheteroaromatic scaffolds (*i.e.* bis-benzothiophene, bis-indole, and "all thiophene" core).

In this work the enantiorecognition ability of our smart films towards L- and D-DOPA will be presented focusing on the variation in voltammetric peak separation of the probe enantiomers when changing *i)* the medium (*e.g.* increasing pH), *ii)* the nature of electrode material and *iii)* the probe carboxylic unit (*i.e.* DOPA methyl ester). The impressive enantiomer peak potential separation combined with the peak current linear dynamic ranges enables to estimate enantiomeric excesses in probe enantiomeric mixtures. Such synthetic electrode surfaces able to neatly discriminate the antipodes of chiral probes as separate peaks are unprecedented in literature, opening the way to the development of efficient chiral voltammetric sensors.

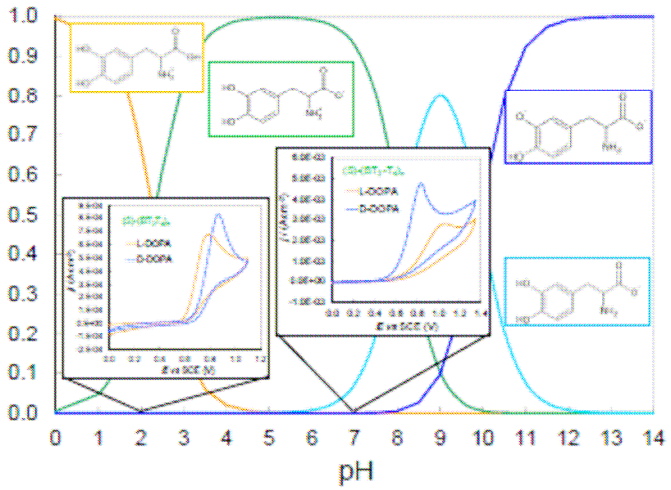

Figure. Effect of the variation in the pH medium on the enantiorecognition ability of our bithianaphthene-based $(BT_2\text{-}T_4)_n$ inherently chiral electrodes with L- and D-DOPA probes, superimposed on a speciation plot of DOPA.

This work was supported by Fondazione Cariplo (Grant no. 2011-0417)

References

[1] F. Sannicolò, S. Arnaboldi, T. Benincori, V. Bonometti, R. Cirilli, L. Dunsch, W. Kutner, G. Longhi, P. R. Mussini, M. Panigati, M. Pierini and S. Rizzo, *Angewandte Chemie Int. Ed.*, 53 (2014), 2623
[2] F. Sannicolò, P. R. Mussini, T. Benincori, R. Cirilli, S. Abbate, S. Arnaboldi, S. Casolo, E. Castiglioni, G. Longhi, R. Martinazzo, M. Panigati, M. Pappini, E. Quartapelle Procopio, S. Rizzo, *Chemistry-A European Journal* 10, (2014), 15261
[3] S. Arnaboldi, P. Mussini, M. Magni, F. Sannicolò, T. Benincori, R. Cirilli, K. Noworyta and W. Kutner, *Chemical Science*, 6 (2015), 1706