NOVEL ANIONOPHORES FOR BIOSENSOR APPLICATIONS CHARACTERISATION OF IMIDAZOLIUM PROTOPHANES AND CYCLOPHANES ON GOLD SURFACES

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The development of miniaturized sensor devices for the detection and analysis of biologically relevant molecules is a rapidly growing research field with particular importance in many areas of modern life sciences like medicine technology, therapeutics, farmaceutical research and biosciences. In such sensors, one of the fundamental principles of signal generation relies on molecular recognition, where specific interactions between an organic host and a guest molecule are present; DNA sensor arrays or sensors based on antigen /antibody interactions are most prominent examples.[1]

During the last decades a variety of organic host molecules have been described that are also capable to recognize and to interact selectively with small molecules or inorganic ions. Among these, by far more cation host molecules are described than anions receptors.[2]

Recently it has been shown that organic compounds based on positively charged imidazolium molecules can act as efficient host for anions.[3,4] These imidazoliophanes interact reversible with oxoanions or halides and can serve as models for anion recognition. [4]
We have synthesized a series of novel anionophores based on imidazolium protophanes and heterocyclophanes (see figure 1). NMR titration experiments in polar media reveal their good anion recognition capacity and selectivity of the compounds towards phosphate over carboxylates or halides.

Modification of the anionophores with alkylthioether anchor groups allows them to be deposited onto gold surfaces of sensor electrodes.

Here we report on the results of surface deposition of the novel amphiphilic imidazolium heterocyclophanes and protophanes on gold electrodes and their characterization by techniques like Atomic Force Microscopy (AFM), Time-of-Flight Secondary Ion Mass Spectrometry (TOF-SIMS) and Contact angle measurements.

References:

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Figures:

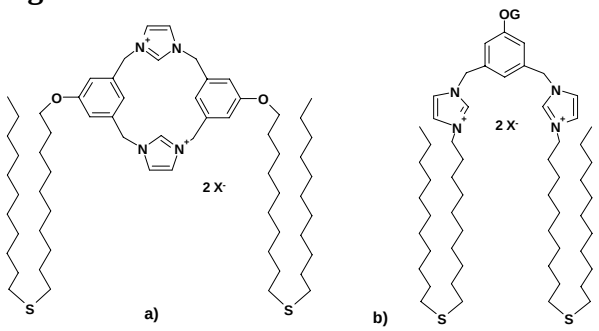

Figure 1: Chemical structure of heterocyclophanes (a) and protophanes (b)

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