DESCRIPTION FOR THE GENERAL PUBLIC

In the frame of the project we are going to develop the new electromediating layers based on the functionalized complexes of transition metal ions. The redox active complexes created on the electrode surface will play the role of:

1) nano-connectors allowing for oriented immobilization of receptors destined for anion recognition at the border of aqueous/solid interphase,
2) transducer of energy coming from the receptor-anion recognition processes into readable analytical signal.

The main components of developed layers will be hybride compounds containing in their structure redox active centres and anion receptor. As the redox centres and nano-connectors we will apply the complexes of Cu(II), Co(II), Ni(II) with derivatives of dipyrromethene, terpyridine and sarcophagine. The derivatives of urea and cyclopeptides will play anion receptors role. The selection of complexed metal as well as structure of redox active centres – electrode surface and redox active centres-complex receptor-analyte connectors allow for regulation of sensitivity and selectivity of created layers in relation to anion recognition.

One of the main goal of the project is the elaboration of the mechanism of analytical signal generated as the results of the following processes:

1) intermolecular recognition receptor-analyte;
2) chemical and electrochemical communication of analyte-receptor complex localized at the interface with redox active centre localized at the surface of modified electrode (gold or carbon);
3) chemical and electrochemical communication of redox active centre with surface of electrode;

The next goal is the determination of the association constant receptor - analyte at the interphase.

In particular, we will put our attention on the relationship between the chemical structure of the redox active layer and value of generated analytical signal.

The research proposed for this project will have mainly potential of fundamental studies. The obtained results will contribute to enlargement of basic knowledge concerning the communication processes between redox centres localized on the modified electrode surface and receptor-anion complex localized at the aqueous/electrode interface.

This knowledge will be applied in future for construction of sensitive and selective sensors destined for food control, medical diagnosis and environmental monitoring.