BASIC INFORMATION ON SUB-PROJECT

NAME OF PROGRAMME/FUND	Scholarship Fund - Sciex NMS^{ch}
RESEARCH FIELD AND OTHER RESEARCH FIELDS INVOLVED (if applicable)	Chemistry
TITLE OF THE SUB-PROJECT	Electron Transport in Nanoscale Host Guest Assemblies (ETNA)
REGION OF THE CZECH REPUBLIC (according to the location of the home institution)	Prague
GRANT AMOUNT SPENT	139 967,15 CHF
INTERMEDIATE BODY	Swissuniversities
HOME INSTITUTION	Academy of Scienes, Czech Republic J. Heyrovsky Institute of Physical Chemistry,
HOST INSTITUTION	University of Bern Departement of Chemistry and Biochemistry
NAME OF THE FELLOW	Viliam Kolivoška

ABSTRACT OF THE SUB-PROJECT	The main idea of the project is to study the electron transfer in non-covalent molecular assemblies by electrochemical scanning tunneling microscopy and spectroscopy (STM/STS, SHINERS) and conductive probe atomic force microscopy (CP-AFM). The host/guest (beta-cyclodextrin/ferrocene) complexes used in this study, will be explored as single molecule switches with a potential application in future nanoelectronic assemblies. Depending on the electrode potential, the host/guest assembly can be reversibly switched between its „on“ and „off“ states, which can selectively control the flow of electric current through it. The experiments will be carried out under electrochemical control using the concept of an "electrochemical gate field". The beta-cyclodextrin (host) molecules will be assembled on single-crystal gold substrates providing a well-definded tailored "sensoric" layer capable of interacting with ferrocene (guest) moieties, the latter being attached to the tip of a scanning probe microscope through conductive oligo(phenylene-ethynylene) linkers. The length of the conductive linkers as well as the cyclodextrin cavity structure will be varied, and their effect on the electron transfer signatures will be investigated in detail. The aim of the work is to (1) understand the nature of the electron transfer pathways in beta-cyclodextrin/ferrocene assemblies, (2) to study the host-guest interaction forces at a single molcule level and (3) to find optimal conditions for creating an adressable and functioning molecular switch with potential for applications in future molecular-based "devices".
MAIN RESULTS	
DATE OF REALISATION OF THE FELLOWSHIP	1.10.2011 - 31.3.2013
MORE INFORMATION ON THE PROGRAMME	**www.sciex.ch**