

**Project:** Electrochemical measurements on purple bacteria reaction centres deposited on inorganic substrates

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**Period of STMS (begin- and end date):** 14. – 26. 09. 2014

**Host institution (address):** VU Amsterdam, De Boelelaan 1081, 081 HV Amsterdam

**Mentor(s) (name and contact data):** Krzysztof Gibasiewicz, PhD, krzysztof.gibasiewicz@amu.edu.pl

**Aims & subject of work:**

The aim of the STSM were studies on interactions between purple bacteria reaction centres (RC) and titanium dioxide (TiO<sub>2</sub>) nanoparticles' layers by the means of electrochemical measurements, as well as getting acquainted with devices for photocurrent measurements present at host laboratory and conducting preliminary electrochemical survey including reference measurements on e.g. sole substrates.

**Argumentation of necessity of STSM:**

Conducted studies were essential to examine photovoltaic cells prepared by our work group, on electrochemical setup at host laboratory.

**Workplan/timeschedule followed:**

- improving the deposition process according to host's experience
- preparing working half-electrode for bio-hybrid cells
- getting acquainted with devices for photocurrent measurements present at host laboratory
- conducting preliminary electrochemical measurements

**Main results and outcome:**

The aim of the survey was to examine, whether the half-cells prepared using procedure developed by my workgroup, with deposited reaction centres, were able to produce any photocurrent. Obtained photocurrents in fore-mentioned setups were commonly 300 nA for 50 nm TiO<sub>2</sub> nanoparticles when half-cell was immersed in sodium dithionite electrolyte, and 150 nA for 50 nm TiO<sub>2</sub> nanoparticles when half-cell was immersed in TMPD electrolyte.

A working Graetzel cell, using blackberry juice was prepared to contrast and compare results obtained for bio-hybrid cells. It was also measured by the means of chronoamperometry.

The Short Term Scientific Mission at Vrije Universiteit, under the supervision of Raoul N. Friese, my host, was successful. Even though the electrodeposition did not give expected results, the electrochemical measurements have proved that half- and full-cells prepared by my workgroup are producing photocurrent of significant and measurable amplitude.

