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My Scientific Report of Short Term Scientific Mission, COST P9

During two weeks of my STSM I participated on the European Young Investigator Conference at Gniezno (EYIC, June 7-12, 2005) and afterwards visited the laboratory from 12 June till 19 June 2005 at Institute of Applied Radiation Chemistry, Technical University of Lodz under the supervision of Dr. M. Wolszczak.
The main aim of my visit was to learn a completely new for me photolysis technique and to perform pulse radiolysis studies of 6-chlorouracil and tetraphenyl iron porphyrin in water solution.
Additionally, during my work in that Institute I was introduced also to other techniques e.g. kinetic spectrophotometric (absorption and emission) detection and spectrofluorometeric, which are applied for studies of radiation damage in a biomolecular system.

The pulse radiolysis experiment was performed by mean of Linac ELU-6e (linear accelerator) generating electron beam pulses of duration variable from 2.5 ns to 4.5 μs. The dose per pulse from 2 Gy to 1 kGy was deposited in a 1 cm quartz cell perpendicular to the monitoring light beam (250-2000nm). Data recording was done by using four oscilloscopes with different time sweeps, allowing provide the kinetic studies of short- and long-lived transient simultaneous observation due to only single pulse excitation.

In the case of 6-chlorouracil in aqueous solutions, no previous pulse radiolysis studies was performed. The solution with the halouracil was deaerated by bubbling with N_2 and the sample flowed through the irradiation cell and was replenished between pulses. Before and after pulse radiolysis the optical absorption spectra of 6-chlorouracil were measured between 200 and 500 nm. The analyses of these results and a comparison with 5-chlorouracil are still in progress.

The pulse radiolysis for tetraphenyl iron (III) porphyrin in different solution was studied. Iron (III) porphyrins undergo reduction to $Fe^{II}TPP$ upon excitation at their ligand-to-metal charge transfer band. In this experiment the stability of the produced transient depended on the medium was observed.

For both molecules the most stable product was Cl^-, which was also observed in the electron attachment studies in the gas phase performed in the Institute of Ion Physics in Innsbruck.

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Innsbruck 07.07.2005

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