Project: Study of singlet oxygen generation by photosynthetic processes

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Host institution: Biologie Structurale et Mécanismes, IBITeC-S,CEA-Saclay(FR)
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Aims & subject of work:

We aimed to measure rapid scan FTIR spectra of quinone depleted isolated photosynthetic reaction centers (RC). The specific lines in the vibration spectra are expected to be assigned to specific conformation states of the RC.

Argumentation of necessity of STSM:

The laboratory in Saclay is leading in the world in the field of FTIR difference spectroscopy, especially in its application to photosynthesis. Dr. Leibl and Dr. Mezzetti are especially expert in time-resolved FTIR measurements which would be hard to carry out in other laboratories. In particular, the first step-scan FTIR paper on photosynthesis published by Burie, Nabedryk, Leibl and Breton in Applied spectroscopy (1993) was completed in the Saclay laboratory.

Workplan/timeschedule followed:

- RCs are prepared in the Szeged laboratory and brought to Saclay where the measurements are conducted.
- Carotenoid containing Rhodobacter (Rb.) sphaeroides 2.4.1. and carotenoid less R-26 strains for quinone depletion procedure and RCs from genetically engineered mutants which lack quinones inherently are used.
- Measurement of rapid scan FTIR spectra of quinone depleted isolated photosynthetic reaction centers.
- Evaluation of the first results and discussion on the future directions of the collaboration within this COST action.

Main results and outcome:

- We managed to set conditions for measuring step scan FTIR and measuring signal in the mid-IR for quinone depleted RCs.
- Although the signal amplitude is very small due to the low quinone concentration, several bands in the spectra were identified which belong to species known in the literature. We did the first steps to evaluate our results according to our earlier transient absorption (TA) and grating (TG) experiments.
- One lecture was given in the frame of the institute seminar series (title: *Photosynthetic reaction centers – hybrid nanostructures*).