Soutenance de thèse

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Electron and multielectron-reaction characterizations in molecular photosystems by laser flash photolysis, toward energy production by artificial photosynthesis

The energy demand of humanity is increasing rapidly, and shows no signs of slowing. Alongside this issue, abuse using fossil fuels is one of the main reasons which leads to an increase in atmospheric CO_2 concentration. These problems have to be solved in terms of both limiting CO_2 emission and finding renewable energy sources to replace fossil fuels. Nowadays, solar energy appears as one of the most effective renewable energy sources. Conversion of solar light energy to electricity in photovoltaics or to chemical energy through photocatalytic processes invariably involves photoinduced energy transfer and electron transfer. In this context, the aim of the thesis focuses on studying photoinduced processes in molecular photosystems using laser flash photolysis.

The first theme of this thesis focus on studying single electron transfer in Donor-Acceptor Dyad systems towards optimization efficiency of charge separation and application in the photovoltaic organic solar cell.
In the second theme of this thesis, two model systems of artificial photosynthesis were investigated to assess the possibility of stepwise charge accumulation on model molecules. A fairly good global yield of approximately 9% for the two charge accumulation on MV^{2+} molecule was achieved. Then, different photocatalytic systems, which have developed for CO_2 reduction, were studied. Understanding of the photoinduced processes is an important step toward improving the efficiency of reduction of CO_2 in practical photocatalytic systems.

Vendredi 27 septembre 2019 à 9 h 30
Amphithéâtre du bât 520 (3ème étage)
Université Paris-Sud, 91405 Orsay Cedex

La soutenance sera suivie d'un pot auquel vous êtes chaleureusement conviés.