



Seminarankündigung

Dienstag, 21. Januar 2014

15:00 Uhr

WSI, Seminarraum S 101

“Electron relays for biofuel cells and biophotovoltaics”

The trend in energy conversion based on bioelectrochemical processes is to aim for direct electron transfer between electrodes and the redox centers of the biocatalyst. The intended outcome is to achieve energy conversion at minimal voltage loss. This strategy is often ideal when direct electron transfer is fast. However, this is not the case for all redox enzymes and in some cases fast direct electron transfer even induces enzyme deactivation.

Electron relays may be implemented as efficient alternative provided their properties, and in particular their redox potential, are tuned to enable maximal current density at low overpotential. To illustrate the desired parameters of an electron relay and of its polymeric supporting matrix, the example of biophotoelectrochemical cells as well as a full biophotovoltaic cell based on photosynthetic protein complexes will be given.

The direct electron transfer configuration also affects the activity of hydrogenases, in particular at high potential and in presence of oxygen. In biofuel cell applications, the electron relay, beyond its role in electron transfer, may also be applied for shielding the hydrogenase biocatalysts from high potential deactivation and oxygen damage. Various further strategies for shielding from oxygen damage will be presented.

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